CONNECTICUT RIVER BASIN
CHESTER, CONNECTICUT

PATTACONK RESERVOIR DAM
CT 00398

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

MARCH 1979

UNCLASSIFIED

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The 23 foot high dam on Pattaconk Brook is an earth embankment approximately 416 feet in length, 100 feet of which is a continuous earth dike confining an area of a borrow excavation which is flooded regularly. Based on the visual inspection and past performance, the dam appears to be in poor condition. Based upon the size (Small) and hazard classification (High) of the dam. The test flood will be equivalent to ½ the PMF.

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF:

NEDED-E

JUL 10 1979

Honorable Ella T. Grasso
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

Dear Governor Grasso:

I am forwarding for your use a copy of the Pattaconk Reservoir Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. The report is based upon a visual inspection, a review of past performance, and a preliminary hydrological analysis. A brief assessment which emphasizes the inadequacy of the project spillway under test flood conditions is included at the beginning of the report.

The preliminary hydrologic analysis has indicated that the spillway capacity for the Pattaconk Reservoir Dam would likely be exceeded by floods greater than 34 percent of one-half the Probable Maximum Flood (1/2 PMF), the test flood for spillway adequacy. Screening criteria for initial review of spillway adequacy specifies that this class of dam, having insufficient spillway capacity to discharge of the 1/2 PMF, should be adjudged as having a seriously inadequate spillway and the dam assessed as unsafe, non-emergency, until more detailed studies prove otherwise or corrective measures are completed.

The classification of "unsafe" applied to a dam because of a seriously inadequate spillway is not meant to indicate the same degree of emergency as would be associated with "unsafe" classification applied for a structural deficiency. It does mean, however, that based on an initial screening and preliminary computations there appears to be a serious deficiency in spillway capacity. This could render the dam unsafe in the event of a severe storm which would likely cause overtopping and possible failure of the dam, significantly increasing the hazard potential for loss of life downstream from the dam.

NEDED-E
Honorable Ella T. Grasso

It is recommended that within twelve months from the date of this report the owner of the dam engage the services of a professional or consulting engineer to determine by more sophisticated methods and procedures the magnitude of the spillway deficiency. Based on this determination, appropriate remedial mitigating measures should be designed and completed within 24 months of this date of notification. In the interim a detailed emergency operation plan and warning system should be promptly developed. During periods of unusually heavy precipitation, round-the-clock surveillance should be provided.

I have approved the report and support the findings and recommendations described in Section 7, with qualifications as noted above. I request that you keep me informed of the actions taken to implement these recommendations since this follow-up is an important part of the non-Federal Dam Inspection Program.

A copy of this report has been forwarded to the Department of Environmental Protection, the owner and the cooperating agency for the State of Connecticut.

Copies of this report will be made available to the public, upon request to this office, under the Freedom of Information Act, thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Protection for the cooperation extended in carrying out this program.

Sincerely yours,

MAX B. SCHEIDER
Colonel, Corps of Engineers
Division Engineer

CONNECTICUT RIVER BASIN
CHESTER, CONNECTICUT

PATTACONK RESERVOIR DAM
CT 00398

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

MARCH 1979

BRIEF ASSESSMENT

PHASE I INSPECTION REPORTS

NATIONAL PROGRAM OF INSPECTION OF DAMS

Name of Dam:	PATTACONK RESERVOIR DAM
Inventory Number:	CT 00398
State Located:	CONNECTICUT
County Located:	MIDDLESEX
Town Located:	CHESTER
Stream:	PATTACONK BROOK
Owner:	STATE OF CONNECTICUT
Date of Inspection:	12/9/78, 1/22/79, 1/25/79
Initial Inspection Team:	Peter M. Heynen
	Calvin R. Goldsmith
	Gonzalo Castro
	Charles Osgood
	Charles Phillips

The 23 foot high dam on Pattaconk Brook is an earth embankment approximately 416 feet in length, 100 feet of which is a continuous earth dike confining an area of a borrow excavation which is flooded regularly. The top of the dam is irregular with a typical width of 17 feet. The upstream slope is at a 2.5 horizontal to 1 vertical inclination while the downstream slope is inclined to 1.75 horizontal to 1 vertical. The upstream slope is protected with riprap while the downstream slope is covered with a fairly heavy growth of brush and small saplings. The 28 foot long spillway crest is of concrete and may be described as a broad crested concrete weir. Immediately downstream of the crest, the spillway is lined with large stones. The outlet gate is located in the concrete gate structure in the pond 25 feet offshore of the dam, and is presently inoperable. The condition of the structure and that of the low level conduit is unknown. At the downstream toe of the dam, the low level outlet is a stone masonry culvert 1.5 feet high by 2.0 feet wide.

Based on the visual inspections and past performance, the dam appears to be in poor condition. No evidence of immediate instability of the earth dam was observed, however there are some areas requiring attention.

Based upon the size (Small) and hazard classification (High) of the dam in accordance with Corps of Engineers Guidelines, the test flood will be equivalent to one-half the Probable Maximum Flood (PMF). Peak inflow to the reservoir is 2100 cubic feet per second (cfs); peak outflow (Test Flood) is 1550 cfs with the dam overtopped 1.1 feet. Based upon our hydraulics computations, the spillway capacity is 530 cfs which is equivalent to 34% of the routed Test Flood Outflow.

It is recommended that further studies be undertaken to perform a more refined hydraulic/hydrologic study to determine the best way to increase the ability of the spillway and the low level outlet to pass a greater percentage of the Test Flood.

It is also recommended that a registered professional engineer qualified in dam design and inspection undertake the following investigations:

1. Inspect the low level gate, gate operating mechanism, and conduit, and formulate recommendations for their rennovation.

2. Inspect the right spillway wingwall and recommend a method for the repair of the undermining of the wall to insure its future stability.

3. Investigate the origin and significance of two seeps on the downstream slope of the dam, and recommend a program of controlling, monitoring, and if needed, eliminating one or both of the seeps.

The above recommendations, and the remedial measures, both of which are described in Section 7, should be instituted within 1 year of the owner's receipt of this report.

Peter M. Heynen, P.E.
Project Manager
Cahn Engineers, Inc.

STATE OF CONNECTICUT
PETER M. HEYNEN
NO. 9618
REGISTERED
PROFESSIONAL ENGINEER

Edgar B. Vinal, Jr., P.E.
Senior Vice President
Cahn Engineers, Inc.

STATE OF CONNECTICUT
EDGAR B. VINAL, JR.
No. 4198
REGISTERED
PROFESSIONAL ENGINEER

This Phase I Inspection Report on Pattaconk Reservoir Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

JOSEPH W. FINEGAN, JR., MEMBER
Water Control Branch
Engineering Division

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

JOSEPH A. MCELROY, CHAIRMAN
Chief, NED Materials Testing Lab.
Foundations & Materials Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspection. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam would necessarily represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions will be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions there of. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as neccessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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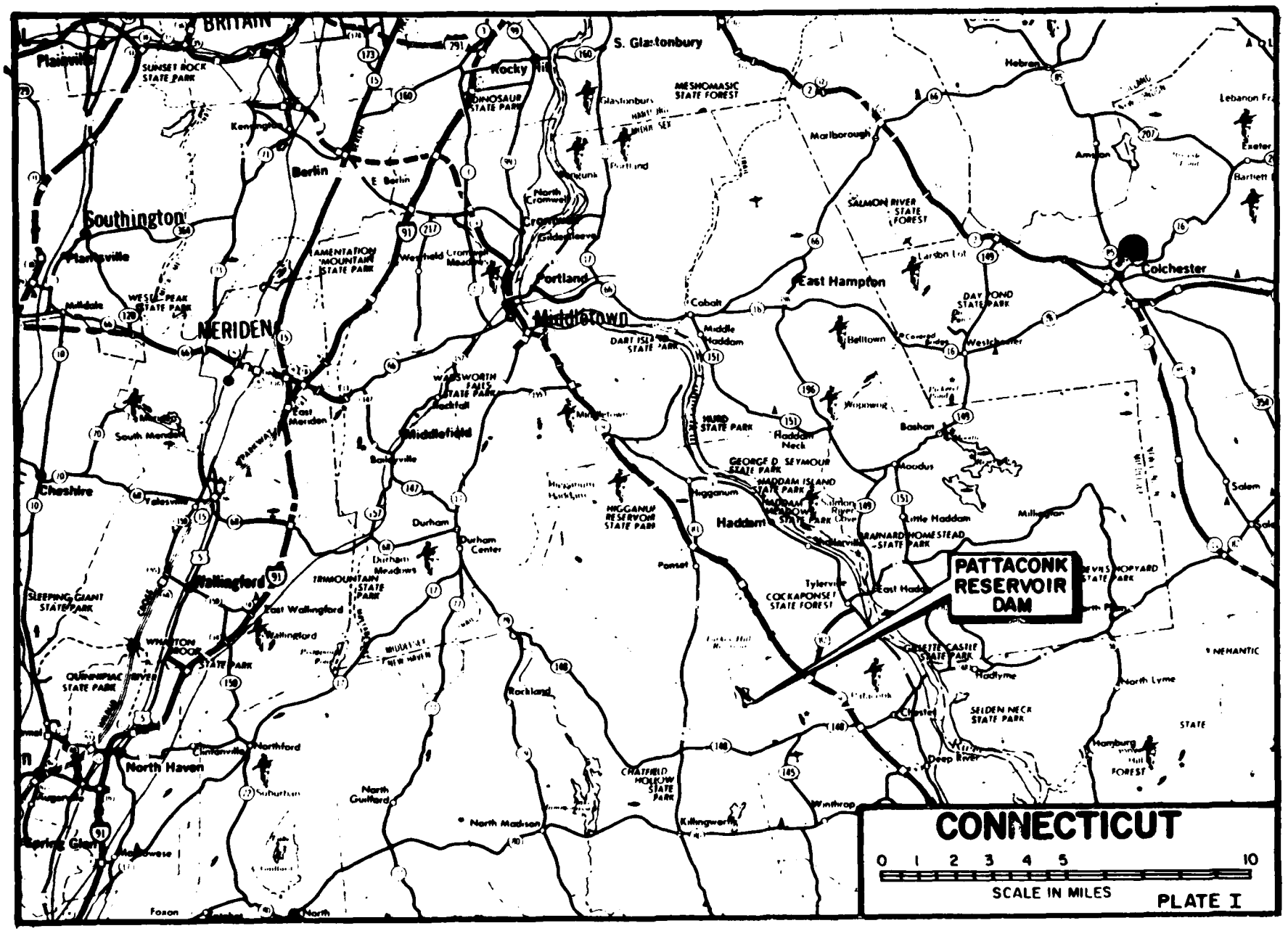
OVERVIEW PHOTO

US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.	NATIONAL PROGRAM OF	Pattaconk Reservoir Dam	Chester	DATE Mar. 1979
CAHN ENGINEERS INC. WALLINGFORD, CONN. ENGINEER	INSPECTION OF NON-FED DAMS	Pattaconk Brook	CONNECTICUT	CE # 27595 KA PAGE viii


PATTACONK
RESERVOIR
DAM
CONNECTICUT
0 1 2 3 4 5 10
SCALE IN MILES
PLATE I

PHASE I INSPECTION REPORT

PATTACONK RESERVOIR DAM

SECTION I
PROJECT INFORMATION

1.1 GENERAL

a. Authority - Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Cahn Engineers, Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed were issued to Cahn Engineers, Inc. under a letter of November 28, 1978 from Max B. Scheider, Colonel, Corps of Engineers. Contract No. DACW 33-79-C-0014 has been assigned by the Corps of Engineers for this work.

b. Purpose of Inspection Program - The purposes of the program are to:

(1) Perform technical inspection and evaluation of non-federal dams to identify conditions requiring correction in a timely manner by non-federal interests.

2) Encourage and prepare the States to quickly initiate effective dam inspection programs for non-federal dams.

(3) To update, verify and complete the National Inventory of Dams.

c. Scope of Inspection Program - The scope of this Phase I inspection report includes:

(1) Gathering, reviewing and presenting all available data as can be obtained from the owners, previous owners, the state and other associated parties.

(2) A field inspection of the facility detailing the visual condition of the dam, embankments and appurtenant structures.

(3) Computations concerning the hydraulics and hydrology of the facility and its relationship to the calculated flood through the existing spillway.

(4) An assessment of the condition of the facility and corrective measures required.

It should be noted that this report does not pass judgement on the safety or stability of the dam other than on a visual basis. The inspection is to identify those features on the dam which need corrective action and/or further study.

1.2 Description of Project

a. Location - The dam is located on Pattaconk Brook in Cockaponset State Forest, a rural area of the Town of Chester, County of Middlesex, State of Connecticut. The dam is shown on the U.S.G.S. Haddam Quadrangle Map having coordinates latitude N41° 24.5' and longitude W72° 31.5'. There are 2 or 3 of A-frame structures and a house approximately 2200 feet downstream of the dam adjacent to Pattaconk Brook.

b. Description of Dam and Appurtenances - The 416 foot long dam is an earth embankment the top of which at elevation 325.6, is approximately 23 feet above the streambed of Pattaconk Brook. The portion of the embankment at the right end of the dam serves as a dike adjacent to a borrow excavation which probably resulted from construction or repair of the dam. The upstream slope of the dam to the crest is covered with large, unevenly placed boulders. The crest of the dam is covered with gravelly sand which is susceptible to wave erosion, as can be seen in Photo 2. The downstream slope of the embankment is covered with a substantial growth of scrub brush and small saplings (Photo 3). The spillway discharge channel and a portion of the right channel sidewall are paved with large stones which have grass growing between them. The low level outlet gate structure shown in Photo 2 is of concrete and is located approximately 25 feet off-shore of the dam. The gate is inoperable and the size, alignment and condition of the low level outlet conduit is unknown. The outlet structure is a dry laid stone wall at the left downstream toe of the embankment shown in Photo 4. The outlet at the downstream toe is a 1.5 foot high by 2 foot wide culvert formed by stone wall construction. No pipe could be seen in the culvert. The discharge channel for the low level outlet is an ill-defined rock and gravel channel leading to the spillway discharge channel.

c. Size Classification - SMALL - The dam impounds a maximum of approximately 824 acre-feet of water with the reservoir level at the top of the dam, which is approximately 23 feet above the bed of Pattaconk Brook. According to the Recommended Guidelines, a dam with storage of less than 1000 acre-feet and/or a height of less than 40 feet is classified as small.

d. Hazard Classification - HIGH - A house and 2 or 3 A-frame residential structures are located approximately 2200 feet downstream of the dam adjacent to Pattaconk Brook, from 2 to 4 feet above the water level. Should the dam breach, there is potential for loss of life at this downstream development.

e. Ownership - State of Connecticut
Department of Environmental Protection
Division of Conservation and Preservation
R.R. 2, Box 150 A
East Hampton, CT 06424
Mr. John Spencer (203) 295-9523
Mr. Charles Phillips (203) 295-9523

At some time prior to 1958, the dam was owned by the Russell Jennings Manufacturing Company. A Connecticut State Park and Forest Commission Map dated January, 1958 shows the dam as being owned by the State of Connecticut and put under the jurisdiction of the Water Resources Commission as a State Park in 1959.

f. Operator - None.

g. Purpose of the Dam - Recreational; Part of Cockaponset State Forest.

h. Design and Construction History - The date and method of construction of the dam are not known. At the request of the Water Resources Commission, John J. Mozzochi and Associates inspected the dam and presented brief recommendations for its rehabilitation in a letter dated April 5, 1966. The recommendations included providing sod cover for the crest of the dam, removing trees and saplings, and raising the right earth dike portion of the dam 2 feet to prevent overtopping. The trees were removed, but no further work appears to have been done.

In 1977, the dam was inspected by a member of the Water Resources Unit. Subsequent recommendations from that inspection included the removal of brush and large trees adjacent to the dam, observation of the most noticeable seepage at the center of the dam at regular intervals, repairing of the leak high on the dam near the spillway, controlling seepage at the toe of the dam, and repairing the low-level outlet to an operable condition. Few, if any, of these measures appear to have been performed.

i. Normal Operational Procedures - There do not appear to be any operational procedures followed for the dam, as the only regulatory outlet is inoperable.

1.3 Pertinent Data

a. Drainage Area -1.9 square miles of rolling, sparsely populated, wooded terrain.

b. Discharge at Damsite - Discharge from the reservoir would come from the spillway, or from the low level stone masonry culvert if operable.

1. Outlet works (stone culvert) size:	1.5'x2.0'
Invert Elev.:	303.3
2. Maximum known flood at damsite:	Unknown
3. Ungated spillway capacity at top of dam:	530 cfs @ 325.3 elev.
4. Ungated spillway capacity at Test flood elevation:	N/A
5. Gated spillway capacity at test flood elevation:	N/A
6. Total spillway capacity at test flood elevation:	N/A
7. Total project discharge @ test flood elevation:	1550 cfs

c. Elevations - (Feet above M.S.L., U.S.G.S. Datum. As there were no elevations available for this dam, the reservoir water surface elevation of 322 feet shown on the Haddam U.S.G.S. Quadrangle Map was assumed to be the elevation of the crest of the spillway. All other elevations are relative to this assumed datum.)

1. Stream bed at center of dam:	303 (approx.)
2. Maximum tailwater:	N/A
3. Upstream portal invert diversion tunnel:	N/A
4. Recreation pool:	322.0
5. Full flood control pool:	N/A
6. Spillway crest:	322.0
7. Design surcharge: (Original Design):	N/A
8. Top Dam:	325.6 325.3 (Minimum)
9. Test flood design surcharge:	N/A

d. Reservoir

1. Length of maximum pool:	3000+ ft.
2. Length of recreation pool:	3000 ft (approx.)
3. Length of flood control pool:	N/A

e. Storage (From U.S. Dam Inventory Sheet; See Appendix Section D-7).

1. Recreation pool:	772 ac.-ft.
2. Flood control pool:	N/A
3. Spillway crest pool:	772 ac.-ft.
4. Top of dam:	824 ac.-ft.
5. Test flood pool:	824+ ac.-ft.

f. Reservoir Surface

1. Top dam:	61 acres
2. Test flood pool:	61+ acres
3. Flood-control pool:	N/A
4. Recreation pool:	55.5 acres
5. Spillway crest:	55.5 acres

g. Dam

1. Type:	Earth embankment
2. Length:	416 ft. (Total) 100 ft. (Dike alone)
3. Height:	23 ft. (approx.)
4. Top Width:	17 ft. (approx.)
5. Side Slopes:	2.5H to 1V (Upstream) 1.75H to 1V (Downstream)
6. Zoning:	N/A
7. Impervious Core:	None
8. Cutoff:	Not known
9. Grout curtain:	N/A
10. Other:	N/A

h. Diversion and Regulating Tunnel

1. Type:	Stone masonry culvert (at outlet)
2. Length:	Not known
3. Closure:	N/A
4. Access:	Intake structure in reservoir
5. Regulating facilities:	Gate at intake structure inoperable

i. Spillway

1. Type:	Concrete weir 1 ft. wide of rectangular cross section

2. Length of weir:	28 ft.
3. Crest elevation:	322.0 (Assumed)
4. Gates:	None
5. U/S Channel	N/A
6. D/S Channel:	Stone Paved and rock ledge
7. General:	Concrete wingwalls

j. Regulating Outlet - Inoperable

1. Invert:	Not known
2. Size:	2 ft. by 1.5 ft.
3. Description:	Stone masonry culvert at outlet
4. Control Mechanism:	Upstream gate in intake structure
5. Other:	N/A

SECTION 2: ENGINEERING DATA

2.1 Design

a. Available Data - The available data all of which is included in Appendix Section B, consists of inspection reports, two property maps, and correspondence by John J. Mozzochi and Associates, William P. Sander, H.A. McKusick, who was the State Forester, Charles J. Pelletier, and the Connecticut State Park and Forest Commission.

b. Design Features - The correspondence indicates the design features noted in Section 1.

c. Design Data - There were no engineering values, assumptions, test results or calculations available for the original construction of the dam or any possible repairs that may have been performed since.

2.2 Construction

a. Available Data - There was no construction data available.

b. Construction Considerations - No information was available.

2.3 Operations

Lake level readings are not taken and no formal operations records are known to exist.

2.4 Evaluation

a. Availability - Existing information was provided by the State of Connecticut, Department of Water and Related Resources. The owner made the dam available for inspection.

b. Adequacy - The limited amount of detailed engineering data available was generally inadequate to allow an in-depth assessment of the dam to be made, therefore, the final assessment of the dam must be based primarily on visual inspection, performance history, hydraulic computations based on approximate hydrologic assumptions, and sound engineering judgement.

c. Validity - A comparison of record data and visual observations reveals no observable significant discrepancies in the record data.

SECTION 3: VISUAL INSPECTION

3.1 Findings

a. General - The general appearance of the dam is poor. Inspection revealed numerous areas requiring maintenance or monitoring, including the low level outlet, the crest of the dam, the downstream face of the dam, and two substantial seeps from the dam.

b. Dam - At the time of our inspection, the water level was at elevation 322.2.

Crest - The crest of the dam is covered with gravelly sand which, without any erosion protection, has been eroded by wave action as can be seen in Photo 2. Note the ice on the crest in the picture, which is due to a combination of wind and wave action.

Upstream Slope - The upstream slope is covered with boulders for wave protection as is also seen in Photo 2. The boulders are irregularly placed and constitute only partially effective riprap protection against waves, as can be seen by erosion of the upstream face and crest through the stones.

Downstream Face - The downstream face of the embankment shown in Photo 3 is covered with brush and small saplings, many of which grow from old stumps. Footpaths are creating eroded areas adjacent to the right spillway wall, the left spillway wall, and to the left of the fence on the right side of the downstream slope.

There are two noticeable seeps. The larger is at the toe of the dam, 47 feet left from the fence at the right side of the downstream slope, as shown in Photo 7. About 1 gallon per minute (GPM) of clear water flows from under an old stump which is about 1 foot in diameter, as shown in Photo 8. The lesser seep, shown in Photos 9 and 10, is 10 feet right of the right spillway wall about 15 feet downslope from the downstream edge of the crest. The water is clear and flows at about 1/4 GPM. Both seeps are located on the Plan of Pattaconk Reservoir Dam in Appendix Section B.

Spillway and Discharge Channel - The spillway is a 28 foot long concrete weir with a crest width of 1 foot. Large stones and grass line the botton of the channel to a lower concrete cutoff wall as shown on Plan in Appendix Section B, and in Photo 5. The wingwalls of the spillway are of concrete, the tops of which are 3.2 feet above the spillway crest. The right wingwall is

either undermined or has a crack at the juncture of the base of the wall and the spillway channel surface. At a point 8.5 feet downstream of the downstream edge of the spillway crest, a ruler was inserted under this wingwall up to 14 inches, at which point soil was encountered. This area is shown in Photo 6.

c. Appurtenant Structures - The gate control structure is concrete and is located in the pond roughly 25 feet offshore of the dam. No information was available on the gate or its operating mechanism other than that it is inoperable. The low level outlet is a dry stone masonry culvert at the left toe of the dam from which there was a flow of roughly 2 gallons per minute at the time of our inspection.

d. Reservoir Area - The reservoir is in a heavily wooded area of Cockaponset State Forest. There are no developments along the shoreline of the reservoir.

e. Downstream Channel - The channel bottom downstream of the spillway is ledge and/or paved with large stones. The right side of the channel is also partially paved with stones immediately downstream of the right spillway wingwall. The inclination of the channel is approximately 5 horizontal to 1 vertical, as determined by rough field survey.

3.2 Evaluation

Based upon the visual inspection, it is possible to assess the dam as being generally in poor condition. The following features which could influence the future condition and/or stability of the dam were identified.

1. The seeps could potentially increase in flow, leading to erosion that could threaten the stability of the dam.

2. Lack of an operational gate control mechanism prevents lowering of the reservoir level in the event of emergency or for increased storage.

3. The cracking and/or undermining of the right wing wall of the spillway endangers its stability. A failure of the wall could result in erosion of the earth embankment.

4. The lack of vegetation or other erosion protection at the crest has already led to erosion which is likely to continue in the future and become more severe.

5. The tree growth on the downstream slope could result in additional seeps along tree roots. The observed seep at the right toe of the dam may be due to a flow path along the roots of a tree.

6. Erosion of the downstream face along the wingwalls and along the fence on the downstream face will increase and cause deterioration of the embankment.

SECTION 4: OPERATIONAL PROCEDURES

4.1 Regulating Procedures

Lake level readings are not taken and there is no operable outlet to regulate the water level in the reservoir.

4.2 Maintenance of Dam

The only maintenance of the dam appears to be the cutting of brush on the downstream face of the dam approximately every 5 years.

4.3 Maintenance of Operating Facilities

The low level outlet gate is inoperable and therefore in need of maintenance. Charles J. Pelletier recommended the outlet be made operable in a message dated April 15, 1977, however at the time of our inspection this had not been accomplished.

4.4 Description of any Formal Warning System in Effect

During times of high water and/or large storms, representatives of the Water and Related Resources Division of the State of Connecticut Department of Environmental Protection visit the site to determine whether or not there is a problem or a potential problem developing at the dam. Should a problem develop, the authorities in downstream communities would be contacted.

4.5 Evaluation

The operation and maintenance procedures are nearly non-existent. A formal program of operation and maintenance procedures should be implemented, including documentation to provide complete records for future reference. Also, a formal warning system should be developed and implemented within the time frame indicated in Section 7.1c. Remedial operation and maintenance recommendations are presented in Section 7.

SECTION 5: HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. General - The dam is neither a high storage nor a high spillage type project. The fetch of the reservoir and the strong winds from the northwest cause significant wave action against the dam. The spillway is a rectangular cross-section one foot in breadth, and was assumed to be a broad-crested weir.

b. Design Data - No computations could be found for the original dam construction.

c. Experience Data - No information on serious problem situations at the dam were found and it is not known whether the dam has ever been overtopped. During a visit to the site by Calvin Goldsmith on January 25, 1979 after heavy rainfall, the water level was at elevation 322.8, which is about 10 inches over the spillway crest.

d. Visual Observations - At the time of our initial inspection several 4 to 6 inch diameter logs were observed both immediately upstream and immediately downstream of the spillway crest. It is possible that in times of severe weather and high water, floating trees and other debris could cause at least partial blockage of the 28 foot long spillway.

e. Test Flood Analysis - The test flood for this high hazard, small size dam is equivalent to one-half the Probable Maximum Flood (PMF).

Based upon "Preliminary Guidance for Estimating Maximum Probable Discharges", dated March, 1978, peak inflow to the reservoir is 2100 cfs (Appendix D-8); peak outflow (Test Flood) is 1550 cfs with the water level 1.1 feet over the top of the spillway walls and 0.7 feet over the top of the earth embankment (Appendix D-13). Based upon our hydraulics computations, the spillway capacity is 530 cfs, which is equivalent to 34 percent of the Test Flood.

f. Dam Failure Analysis - Utilizing the April, 1978, "Rule of Thumb Guidance for Estimating Downstream Dam Failure Hydrographs", the peak failure outflow from the dam breaching would be 13,600 cubic feet per second, which would create a 4.2 foot wave at the 2 or 3 A-frame residential structures and the house, which are approximately 2200 feet downstream of the dam.

SECTION 6: STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations -Visual observations do not indicate any apparent stability problem which could be attributed to movement of foundation or embankment materials.

b. Design and Construction Data - Insufficient data is available on the design and construction to perform a formal stability analysis. There is no data on the foundation grade or the criterion used for excavation. The embankment materials and its zoning are not known, although the location of a borrow pit probably used in construction is evident on the upstream side adjacent to the south end of the dam.

c. Operating Records - The date of construction is unknown, and no operating records are available.

d. Post-construction Changes - There are no post-construction changes known or apparent.

e. Seismic Stability - This dam is in Seismic Zone 1 and hence does not have to be evaluated for seismic stability according to the Recommended Guidelines.

SECTION 7: ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition - Based upon the visual inspection of the site and past performance, the dam appears to be in poor condition. No immediate evidence of structural instability was observed in the embankment, however the right spillway wingwall has been undercut, which must be assumed to reduce the stability of the wall.

The two areas of seepage described in Section 3 possess the potential for serious deterioration of the dam stability. The toe seep we have described as originating under a tree root may or may not be the seep described as "at the middle of the dam" in a report of April 15, 1977 by C. J. Pelletier of the Environmental Protection Agency to the Water Resources Unit. There is no mention of seeps in a report of April 15, 1966 by John J. Mozzochi and Associates to the Water Resources Commission. If the toe seep is due to rotting tree roots, it may increase. The seep near the right spillway wall is probably the one described in the April 15, 1977 report. It is possible that this seep originates in the crack between the right wing wall and the spillway pavement.

These seeps could become serious and threaten the stability of the dam. Under such circumstances, the lack of an operational gate valve to drain the reservoir increases the potential hazard.

Based upon "Preliminary Guidance for Estimating Maximum Probable Discharges" dated March, 1978, peak inflow to the reservoir is 2100 cubic feet per second; peak outflow (Test Flood) is 1550 cubic feet per second with the dam overtopped 1.1 feet. Based upon our hydraulics computations, the spillway capacity is 530 cubic feet per second, which is equivalent to approximately 34 percent of the routed Test Flood Outflow.

b. Adequacy of Information - The information available is such that an assessment of the condition and stability of the dam must be based solely on visual inspection, the past performance of the dam, and sound engineering judgement.

c. Urgency - It is recommended that the measures presented in Section 7.2 and 7.3 be implemented within 1 year, of the owner's receipt of this report.

d. Need for Additional Information - There is a need for more information as recommended in Section 7.2.

7.2 Recommendations

1. Based upon the rough computations in Appendix D, the dam spillway capacity will be exceeded by the Test Flood. More sophisticated flood routing should be undertaken by hydrologists/hydraulics engineers to refine the Test Flood figures. A study should be undertaken and recommendations made on how to increase the spillway capacity based upon the refined Test Flood figures, as well as how to increase the capacity of the low level outlet.

A registered professional engineer qualified in dam design and inspection should perform the following investigations:

2. Inspect the inoperable low level outlet gate and operating mechanism and make recommendations for their repair. The low level outlet conduit should also be investigated and its type and condition ascertained. Recommendations should be made by the engineer as to the suitability of the conduit for future use, and if not suitable, for the repair or replacement of the conduit.

3. Inspect the right spillway wingwall to determine the seriousness of its undermining and the appropriate corrective measures required.

4. Investigate the origin and significance of the two seeps as they concern the composition of the dam and foundation materials. If deemed neccesary by the investigation, recommendations should be made for the elimination of one or both of the seeps. Recommendations should also be made for monitoring the seepage on a regular basis, and for controlling the downstream water flow from the seeps to prevent ponding of water.

7.3 Remedial Measures

a. Operation and Maintenance Procedures - The following measures should be undertaken within the time frame indicated in Section 7.1.c, and continued on a regular basis where applicable.

1. Round-the-clock surveillance should be provided by the owner during periods of unusually heavy precipitation. and high runoff. The owner should develop a formal warning system with local officials for alerting downstream residents in case of an emergency.

2. A formal program of operation and maintenance procedures should be instituted and fully documented to provide accurate records for future reference.

3. A program of inspection by a registered, professional engineer qualified in dam inspection should be instituted on an annual basis. The inspections should be technical in nature and should include the operation of the low level outlet works.

4. The dam should be repaired to the proper elevation in areas where erosion has occurred, and proper measures should be taken to prevent further erosion. Suggested protective measures include placing riprap or the planting of sod. Riprap on the upstream face should be improved and extended to cover the face of the dike portion of the earth dam embankment.

5. The owner should repair erosion occurring along footpaths and adjacent to the fence on the downstream slope, and take preventive measures against future erosion.

6. A plan to remove brush and saplings from the downstream slope should be developed. Brush and trees within 20 feet from the base of the slope and along the outlet works channel should be included in the removal plan.

7.4 Alternatives

This study has identified no practical alternatives to the above recommendations.

APPENDIX

SECTION A: VISUAL OBSERVATIONS

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT PATTACONK RESERVOIR DAM DATE: 12/19/78

TIME: 1:00 PM

WEATHER: SUNNY, WINDY, 35°

W.S. ELEV. 322.3 U.S. _____ DN.S

PARTY:	INITIALS:	DISCIPLINE:
1. PETER M. HEYNEN	PMH	CAHN ENGINEERS, INC.
2. CALVIN R. GOLDSMITH	CRG	CAHN ENGINEERS, INC.
3. GONZALO CASTRO	GC	GEOTECHNICAL ENGINEERS, INC
4. CHARLES OSGOOD	CO	GEOTECHNICAL ENGINEERS, INC
5. CHUCK PHILLIPS	CP	DEPT. CONSERVATION AND
6. _____	_____	PRESERVATION, CONN. D.E.P.

PROJECT FEATURE	INSPECTED BY	REMARKS
1. EARTH DAM EMBANKMENT	PMH, CRG, GC, CO	
2. INTAKE STRUCTURE	PMH, CRG, GC, CO	
3. OUTLET CONDUIT	PMH, CRG, GC, CO	
4. DISCHARGE CHANNEL (LOW LEVEL OUTLET)	PMH, CRG, GC, CO	
5. SPILLWAY AND DISCHARGE CHANNEL (SPILLWAY)	PMH, CRG, GC, CO	
6. _____		
7. _____		
8. _____		
9. _____		
10. _____		
11. _____		
12. _____		

PERIODIC INSPECTION CHECK LIST

PROJECT PATTACONK RESERVOIR DAM DATE 12/19/78

PROJECT FEATURE EARTH DAM EMBANKMENT BY PMH, CRG, GK, CO

AREA EVALUATED	CONDITION
DAM EMBANKMENT	
Crest Elevation	325.6
Current Pool Elevation	3' BELOW TOP OF RT. SPILLWAY WINGWALL
Maximum Impoundment to Date	NA
Surface Cracks	NOT ABLE TO DISCERN DUE TO LOOSE SAND ON CREST OF DAM
Pavement Condition	NA
Movement or Settlement of Crest	U/S NEAR CREST ERODED
Lateral Movement	TOO IRREGULAR TO OBSERVE
Vertical Alignment	
Horizontal Alignment	
Condition at Abutment and at Concrete Structures	EROSION U/S BEHIND LEFT SPILLWAY TRAINING WALL – RT. SPILLWAY WINGWALL UNDERMINED UP TO 14"
Indications of Movement of Structural Items on Slopes	RIPRAP ON U/S SLOPE PARTIALLY COVERED FROM ERODING SAND FROM CREST
Trespassing on Slopes	SOME, BUT D/S SLOPE VERY HEAVY W/ BRUSH. PATHS AND EROSION NEAR SPILLWAY
Sloughing or Erosion of Slopes or Abutments	WAVE ACTION CAUSING SLOUGHING ON U/S SLOPE.
Rock Slope Protection-Riprap Failures	SOME RIPRAP MOVEMENT DUE TO WAVE ACTION
Unusual Movement or Cracking at or Near Toes	NO MOVEMENT OBSERVED
Unusual Embankment or Downstream Seepage	(1 GPM) 2 MAJOR SEEPS - 1 @ RT. D/S TOE AND 1 @ LEFT END NEAR SPILLWAY 8' BELOW CREST
Piping or Boils	NONE EVIDENT
Foundation Drainage Features	NONE
Toe Drains	NONE
Instrumentation System	NONE

PERIODIC INSPECTION CHECK LIST

PROJECT PATTACONK RESERVOIR DAM DATE 12/19/78

PROJECT FEATURE ENTAKE STRUCTURE BY PMH, CRG, GC, CO

AREA EVALUATED		CONDITION
OUTLET WORKS-INTAKE CHANNEL AND INTAKE STRUCTURE		
a) Approach Channel		NA
Slope Conditions		
Bottom Conditions		
Rock Slides or Falls		
Log Boom		
Debris		
Condition of Concrete Lining		
Drains or Weep Holes		
b) Intake Structure		OBSERVED ONLY FROM A DISTANCE
Condition of Concrete		FAIR - SOME SPALLING
Stop Logs and Slots		NA

PERIODIC INSPECTION CHECK LIST

PROJECT YATTACONK RESERVOIR DAM DATE 12/19/78

PROJECT FEATURE OUTLET CONDUIT BY AMH, CRG, GC, CO

AREA EVALUATED		CONDITION
OUTLET WORKS-TRANSITION AND CONDUIT		OUTLET IS A ROCK WALL LINED TUNNEL AT D/S TOE OF DAM. 1.5' HIGH x 2' WIDE. NO PIPE OBSERVED IN TUNNEL. SOME SEEPAGE FROM OUTLET.
General Condition of Concrete		ROCK WALL & TUNNEL NOT CEMENTED, SO NO SPALLING ETC., HOWEVER WALL NOT IN VERY GOOD CONDITION
Rust or Staining on Concrete		
Spalling		
Erosion or Cavitation		
Cracking		
Alignment of Monoliths		NA
Alignment of Joints		NA
Numbering of Monoliths		NA

PERIODIC INSPECTION CHECK LIST

PROJECT PATTACONK RESERVOIR DAM DATE 12/19/78

PROJECT FEATURE DISCHARGE CHANNEL BY PMH, CRG, GF, CO

AREA EVALUATED		CONDITION
OUTLET WORKS-OUTLET STRUCTURE AND OUTLET CHANNEL		
General Condition of Concrete		NA
Rust or Staining		NA
Spalling		NA
Erosion or Cavitation		SOME EROSION AROUND OUTLET @ TOE OF DAM
Visible Reinforcing		NA
Any Seepage or Efflorescence		NONE
Condition at Joints		NA
Drain Holes		NONE OBSERVED
Channel		GRAVEL AND COBBLE IN CHANNEL
Loose Rock or Trees Overhanging Channel		SOME IN AND ADJACENT TO CHANNEL
Condition of Discharge Channel		NOT WELL DEFINED

PERIODIC INSPECTION CHECK LIST

PROJECT PATTACONK RESERVOIR DAM DATE 12/19/78

PROJECT FEATURE SPILLWAY AND DISCHARGE BY PMH, CEG, GC, CO

AREA EVALUATED	CONDITION
OUTLET WORKS-SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a) Approach Channel	
General Condition	NOT ABLE TO BE DETERMINED
Loose Rock Overhanging Channel	NONE
Trees Overhanging Channel	NONE
Floor of Approach Channel	NOT OBSERVED
b) Weir and Training Walls	
General Condition of Concrete	FAIR TO GOOD
Rust or Staining	MINOR
Spalling	SOME, ESPECIALLY NEAR BOTTOM OF WALL
Any Visible Reinforcing	NONE
Any Seepage of Efflorescence	NONE, HOWEVER RT. WALL UNDERMINED UP TO 14"
Drain Holes	NONE OBSERVED
c) Discharge Channel	
General Condition	GOOD
Loose Rock Overhanging Channel	NONE
Trees Overhanging Channel	SOME D/S OF SPILLWAY
Floor of Channel	LINED W/ LARGE FLAT ROCKS AS IS RT. SLOPED SIDE OF CHANNEL NEAR DAM
Other Obstructions	

APPENDIX

SECTION B: EXISTING DATA

APPENDIX

SECTION B: EXISTING DATA
PATTACONK RESERVOIR DAM

SUMMARY OF DATA AND CORRESPONDENCE

DATE	TO	FROM	SUBJECT	Page
May 21, 1963	Files	State Board for the Supervision of Dams	Inventory data	B-3
No date	Files	Fish and Waterlife Dept. of Environmental Protection	Russell Jennings Pond (Pattaconk Reservoir) lake bottom contours	B-4
No date	Files	----------	Property map of area around Pattaconk Reservoir	B-5
Jan. 1958	Files	Connecticut State Park and Forest Commission	Map showing property line between State and Russell Jennings Pond	B-6
April 7, 1966	Donald C. Mathews, Director Park and Forest Commission	William P. Sander Engineer-Geologist	Brief description of dam and maintenance recommendations quoted from John J. Mozzochi's inspection report of 4/5/76	B-7
April 19, 1966	F. A. Wood District Forester	H. A. McKusick State Forester	Plans for maintenance of dam	B-8
May 10, 1966	Files	William P. Sander	Commencement of maintenance procedures	B-9
April 15, 1977	Victor F. Galgowski Water Resources Unit	Charles J. Pelletier Consultant Environmental Protection	Inspection report and recommendations	B-10

MAY 1963 ✓ CLASS B

PS

STATE BOARD FOR THE SUPERVISION OF DAMS
INVENTORY DATA

1-17

CT-398

Name of Dam or Pond PATACONK RESERVOIR

Code No. C 11.6 PT 7.2

Location of Structure LONG 72-31.5

Town CHESTER

Name of Stream PATTACONCK CREEK LAT 41-24.5

U.S.G.S. Quad. HADDAM

Owner IN COCKAPONSET STATE FOREST

Address DEP. ST OF CT

Pond Used For RECREATION

Dimensions of Pond: Width ± 800 FEET Length ± 3000 FEET Area 51.4 ACRES

Total Length of Dam ± 250 FEET Length of Spillway 28 FEET

Depth of Water Below Spillway Level (Downstream) 30' FEET

Height of Abutments Above Spillway ± 4 FEET -3.5 ft

Type of Spillway Construction CONCRETE LIP, ROCK APRON

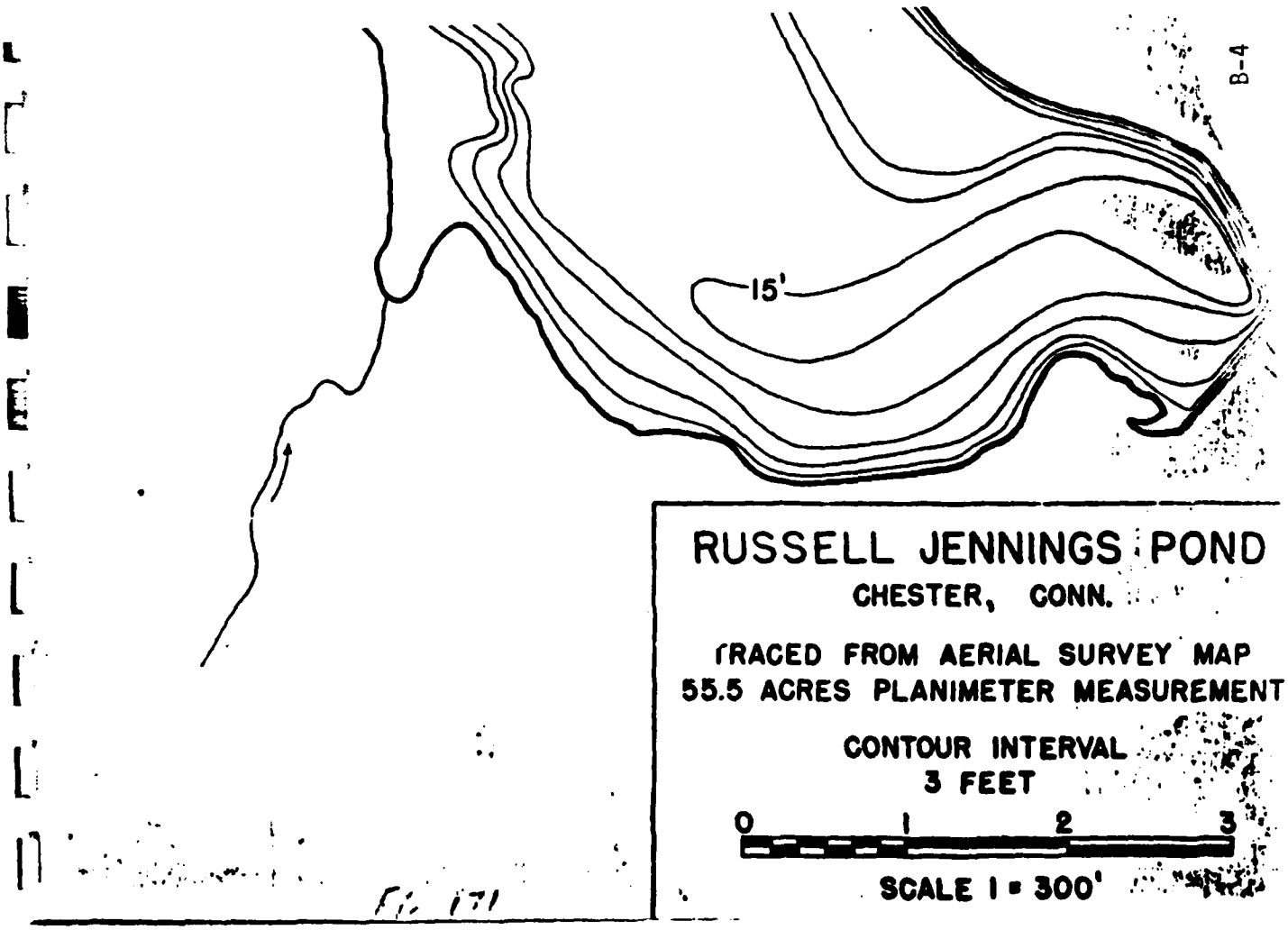
Type of Dike Construction ROCK, EARTH DOWNSTREAM

Downstream Conditions PATTACONCK CREEK

982 Summary of File Data

Remarks FAILURE OF DAM COULD CAUSE DAMAGE DOWNSTREAM.
MANY TREES GROWING ON DIKE.

B-3



RUSSELL JENNINGS POND

CHESTER, CONN.

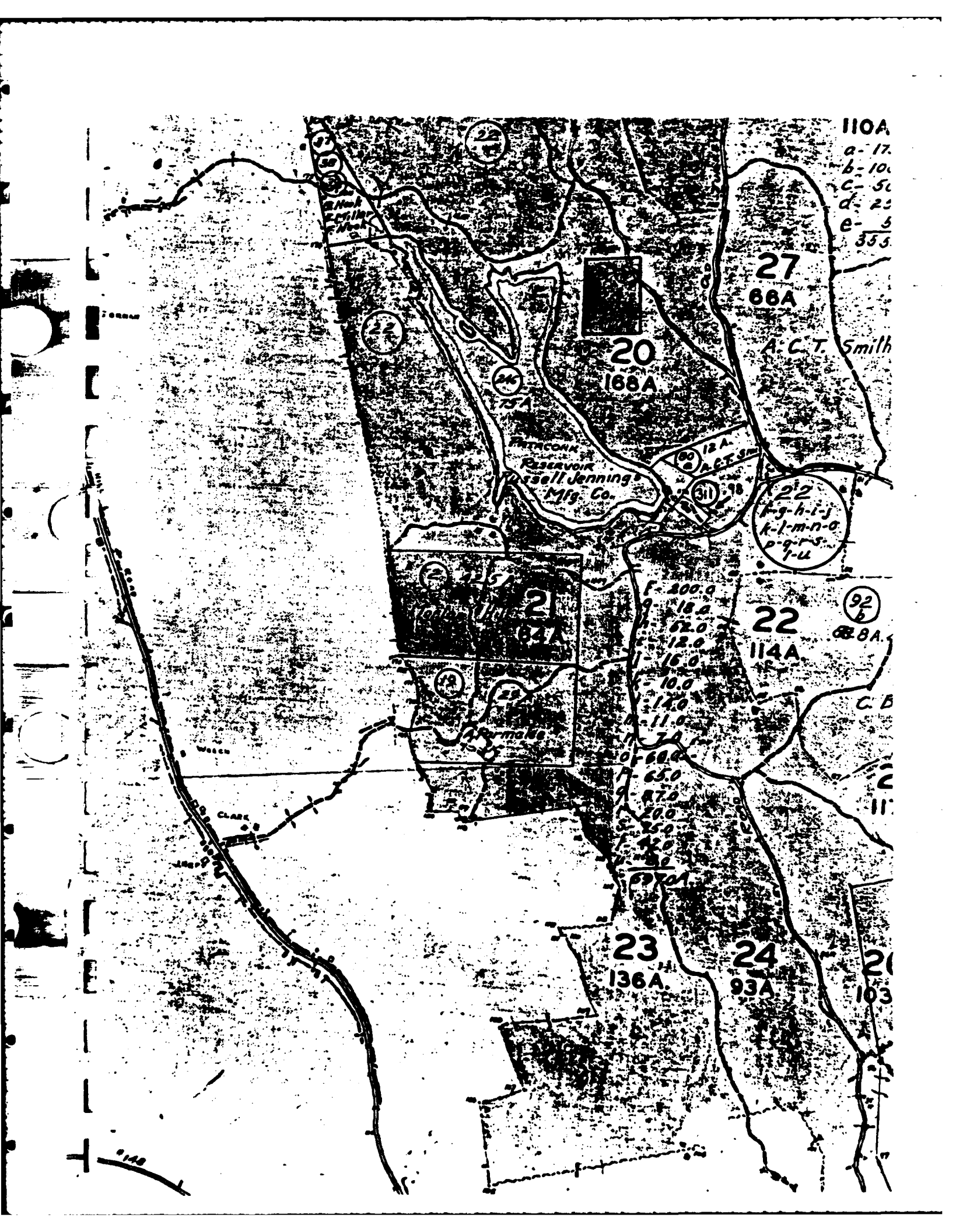
TRACED FROM AERIAL SURVEY MAP
55.5 ACRES PLANIMETER MEASUREMENT

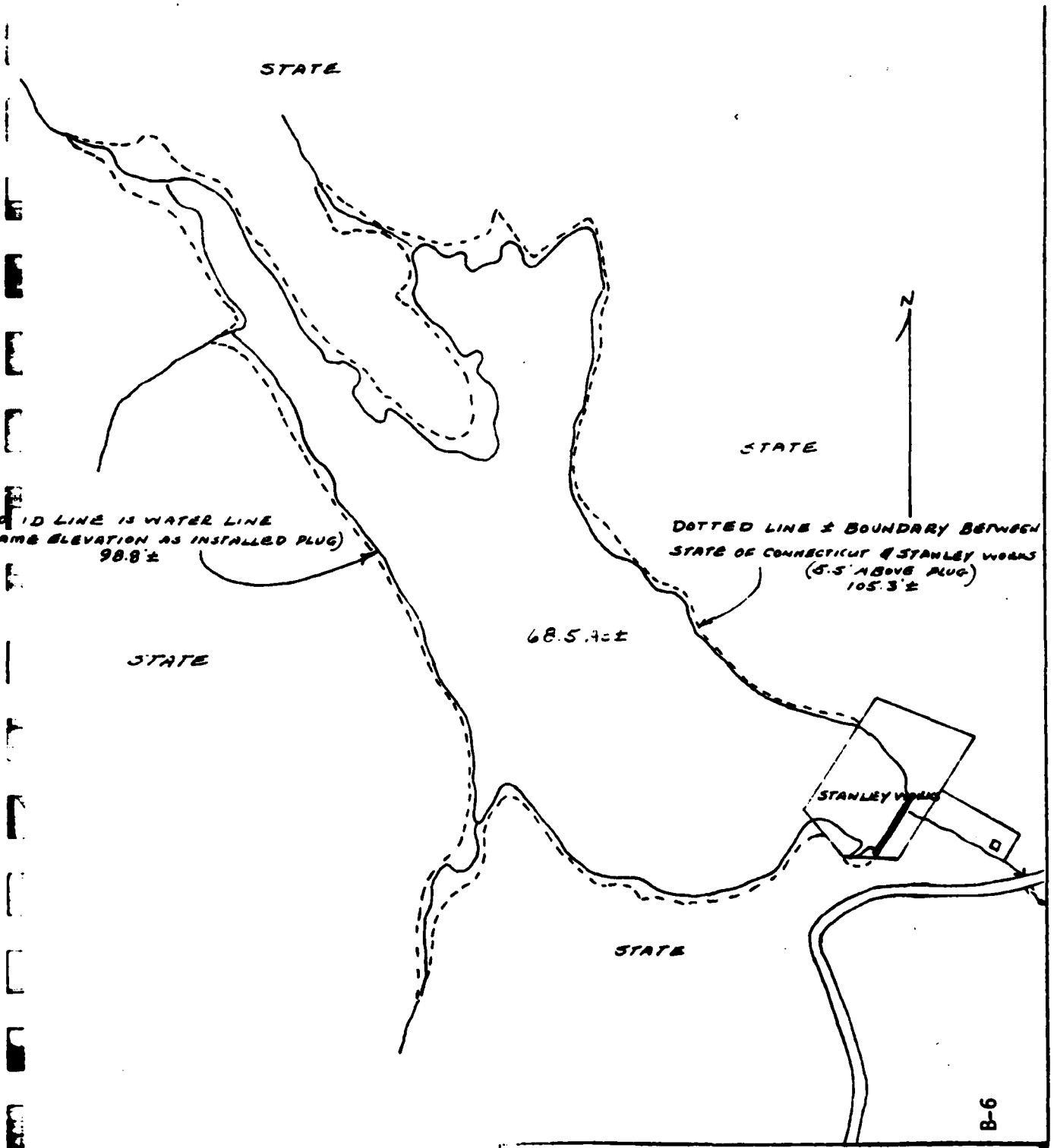
CONTOUR INTERVAL
3 FEET

0 1 2 3

SCALE 1 = 300'

Fig. 171


110A
27
66A
A. C. T. Smith
20
168A
75A
Reservoir
Russell Jenning Mfg. Co.
12 A.
22
f-g-h-i-j
k-l-m-n-o
p-q-r-s-
t-u
21
84A
22
114A
8A.
23
136A.
24
93A
CLARK



CONNECTICUT
STATE PARK AND FOREST
COMMISSION

MAP SHOWING LINE MORE OR LESS BETWEEN
STATE OF CONNECTICUT & RUSSELL JENNINGS POND

DRAWN BY: R. H. Sinay	FILE NO.
AREA: Coe Kapowsett Forest	SCALE: 1 INCH = 500' FEET
TOWN: CHESTER, CONN	DATE: Jan 1958
APPROVED	

April 7, 1966

Mr. Donald C. Mathews, Director
Park and Forest Commission
State Office Building
Hartford, Connecticut

Re: Pataconk Reservoir - Chester

Dear Mr. Mathews:

The Water Resources Commission has recently requested that a consulting engineer inspect the subject dam as part of our continuing program to inspect all dams in the State which are under the jurisdiction of this Commission. The following is from the report submitted after the inspection.

> "This is an earthen dam located in the Cockaponset State Forest. It has a drainage area of 2.5 square miles with a pond area of 60 acres. The south abutment or dike is about 300 feet long with a top width of about 20 feet and a maximum height of about 20 feet. The north abutment is only about 20 feet long with only a 4 foot height. The spillway is about 20 feet wide with concrete threshold, sides and apron and discharges into a steeply sloped channel running along the old ground. The freeboard is 24 inches."
>
> "Being a State Park, the top of the south dike is used as a picnic area. It is covered with a heavy growth of trees and saplings which should be removed. The top surface is interlaced with roots and there is no sod protection. This should be rectified. The discharge channel is separated from the south abutment only by a small ragged dike which should be raised and strengthened. Finally, I recommend that the freeboard of the south abutment be increased at least 2 feet more to prevent any possible overtopping. This will direct flood flows over the north abutment whichiis practically at natural ground level."

We would appreciate being informed what plans your Commission has to implement the above recommendations.

B-7

Very truly yours,

William P. Sander
Engineer - Geologist

WPS:js

FORM PUR 810 201

INTERDEPARTMENT MAIL | DATE April 19, 19

TO: Mr. P. A. Wood, District Forester	DEPARTMENT: Pleasant Valley
FROM: H. A. McMusick, State Forester	DEPARTMENT: Park and Forest
SUBJECT: PATACONK RESERVOIR DAM	

Attached is copy of letter from Mr. William P. Sander of the Water Resources Commission relative to the Pataconk Reservoir Dam.

Just to refresh your memory, this property was acquired by the Commission in 1959 and includes the dam and the flowage right and all other properties then standing in the name of the Russell Holdings Company.

I believe there are some rather substantial errors in the engineer's report quoted relative to the length of the south abutment and the top width. If my memory serves me correctly, the dike extends in a straight line into high ground on the southerly side of the original stream, constituting a distance of perhaps 150 feet from the spillway. There is ample evidence that the dike itself was built with borrow from the upstream side. One, and I think two, of these borrow pits still show rather plainly and perhaps this was considered by the inspecting engineer as part of the dike. The top width is also considerably less than 20 feet, which raises a question in my mind as to the work required to raise the present dike 2 additional feet.

I am sure that the recommendation to remove the trees and saplings from the dike area is entirely sound, and should be and can be done immediately, with the stumps treated with an herbicide. At some not too distant future date, the stumps and major roots may have to be dug out.

However, I would recommend that you and Mr. Emigh make contact with one of the engineers in the Water Resources Commission to learn from them, by an on-the-ground field inspection, just what measures should be undertaken to maintain this dam in a safe and sound condition.

It seems to my unpracticed eye that the dam offers quite a hazard and some danger to downstream developments. At the same time, it would be wise to consider the gate--draw-down facilities--and their present conditions. What would constitute a good periodic inspection of the structure, and annual maintenance?

I think you both realize that the Water Resources Commission is an extremely busy one at the present time and that we should coordinate our request for this on-the-ground service at their earliest convenience. I would like a written report following this contact with the engineer.

B-8

HAM:mbw

H. A. McMusick

cc: Mr. Mathews, Mr. Emigh, Mr. Sander

FORM FOR STD. 20.

INTERDEPARTMENT MAIL

DATE May 10, 1966

TO File

DEPARTMENT

FROM William P. Sander, Engineer - Geologist

DEPARTMENT Water Resources Commission

SUBJECT Pataconk Dam - Chester

On May 4, 1966 a meeting was held at the dam with Francis J. Emigh, Forest Ranger, F. A. Wood, District Forester and the writer to go over the recommendations in John J. Mozzochi's letter dated April 5, 1966.

Mr. Emigh stated that the trees would be removed starting May 5, 1966.

After the meeting in the field, Wood and the writer met with Harry A. McKusick, State Forester at the Park and Forest Commission office in the State Office Building to review Mozzochi's recommendation on raising the dam two feet. It was agreed that the next step would be for Park and Forest to contact the Soil Conservation Service in Haddam to see what their recommedation was so that cost estimates could be prepared.

WPS:js

Interdepartment Message

CT-201 REV. 3-74 STATE OF CONNECTICUT
Form No. 6911-051-01)

SAVE TIME: *Handwritten messages are acceptable.*
Use carbon if you really need a copy. If typewritten, ignore faint lines

	NAME	TITLE	DATE
To	Victor F. Galgowski	Supt. of Dam Maintenance	15 April 1977
	AGENCY: Water Resources Unit	ADDRESS	
From	NAME: Charles J. Pelletier	TITLE: Consultant	TELEPHONE
	AGENCY: Environmental Protection	ADDRESS	

Subject

Pataconk Pond Dam (C-14) - Chester

This dam was inspected on March 30, 1977. The dam is an earth fill structure with riprap facing on the upstream slope.

The top width is about 17 feet. The top is irregular in elevation and is about 4 to 4.5' above the spillway crest. It appeared that sandy material has been dumped on the top and not spread to an uniform surface.

The spillway is at the left abutment of the dam and discharge is over a low concrete weir and via a ledge and rock lined channel.

There is considerable brush growing on the downstream side of the dam and some large trees adjacent to the structure. A few small trees and some brush are growing along the upstream edge of the top of the dam.

There is a concrete structure standing in the pond about 30 feet from the dam which probably supported a gate operating device which has been lost or removed. There is a small masonry tunnel opening on the downstream side of the dam. At the time of observation, there was a flow of 4 or 5 gpm from the tunnel.

There is a seep high on the dam near the overflow spillway. Water was overflowing the spillway at the time of observation. It appears likely that this seep originating in the spillway outflow channel. This can be checked by inspection at a time when the lake level is below the spillway.

There is also a seep at the downstream toe of the dam at about the middle of the dam where the structure height is 17 feet. There does not appear to be any piping action. The surface soil does not appear to be saturated above the toe of the slope. There is lesser seepage evident along the toe where the height is greater than 17 feet.

The point of most noticeable seepage at the center of the dam should be observed at regular intervals to insure that suspended material in the water is noted.

Brush on the dam and large trees adjacent to the dam should be removed.

The leak high on the dam near the spillway should be repaired, especially if it is originating in the pond rather than the spillway channel.

Seepage at the toe of the dam should be controlled so as to prevent more serious conditions such as piping from development.

The gate on the outlet through the dam should be restored to operating condition. This is particularly important as draining the reservoir will be the only possible emergency procedure should the seepage develop into a more serious condition.

Water Resources Unit

CJP:ljk

APPENDIX

SECTION C: DETAIL PHOTOGRAPHS

PHOTO 1 - View of crest and upstream slope of dam. Note inlet structure.

PHOTO 2 - Close-up of upstream slope and inlet structure. Note erosion of upstream face and ice on crest due to wind and wave action.

US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.	NATIONAL PROGRAM OF	PATTACONK RESERVOIR DAM
		PATTACONK BROOK
	INSPECTION OF	CHESTER, CONNECTICUT
CAHN ENGINEERS INC. WALLINGFORD, CONN. ENGINEER	NON-FED. DAMS	CE# 27 595
		DATE Mar. 79 PAGE C-1

PHOTO 3 - Downstream face of dam.

PHOTO 4 - Low level outlet conduit.

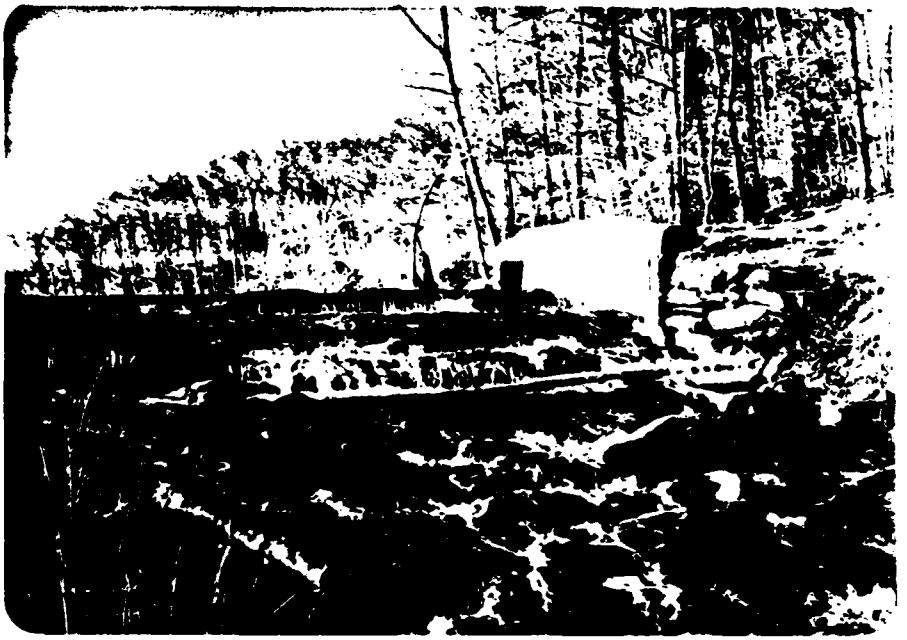


PHOTO 5 - View of spillway and left wingwall from downstream channel.

PHOTO 6 - Right spillway wingwall. Note undermining of wall.

PHOTO 7 - Seep at right downstream toe of dam.

PHOTO 8 - Close-up of seep at right downstream toe of dam.

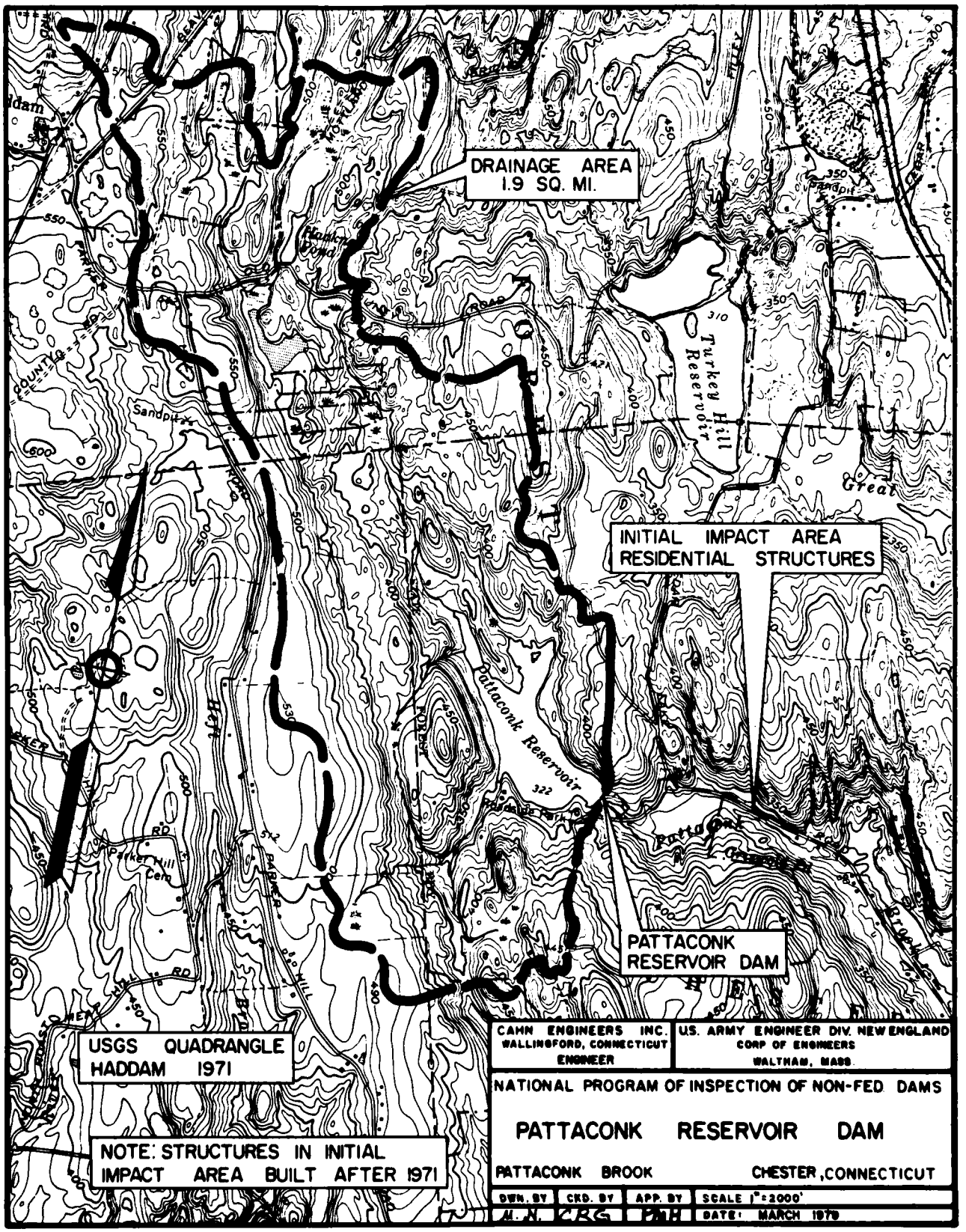
PHOTO 9 - Seep on downstream slope at left end of dam. Note spillway slope in background.

PHOTO 10 - Close-up of seep on downstream slope.

US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.	NATIONAL PROGRAM OF	PATTACONK RESERVOIR DAM
	INSPECTION OF	PATTACONK BROOK
CAHN ENGINEERS INC. WALLINGFORD, CONN. ENGINEER	NON-FED. DAMS	CHESTER, CONNECTICUT
		CE# 27 595 DATE Mar. 79 PAGE C-5

APPENDIX

SECTION D: HYDRAULIC/HYDROLOGIC COMPUTATIONS


DRAINAGE AREA
1.9 SQ. MI.
INITIAL IMPACT AREA
RESIDENTIAL STRUCTURES
PATTACONK
RESERVOIR DAM
USGS QUADRANGLE
HADDAM 1971
NOTE: STRUCTURES IN INITIAL
IMPACT AREA BUILT AFTER 1971
Turkey Hill Reservoir
Pattaconk Reservoir
Hawks Pond
Sandpit
Great
CAHN ENGINEERS INC.
WALLINGFORD, CONNECTICUT
ENGINEER
U.S. ARMY ENGINEER DIV. NEW ENGLAND
CORP OF ENGINEERS
WALTHAM, MASS.
NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS
PATTACONK RESERVOIR DAM
PATTACONK BROOK
CHESTER, CONNECTICUT
DWN. BY
M.N.
CKD. BY
CRG
APP. BY
SCALE 1"=2000'
DATE: MARCH 1979

PRELIMINARY GUIDANCE
FOR ESTIMATING
MAXIMUM PROBABLE DISCHARGES
IN
PHASE I DAM SAFETY
INVESTIGATIONS

New England Division
Corps of Engineers

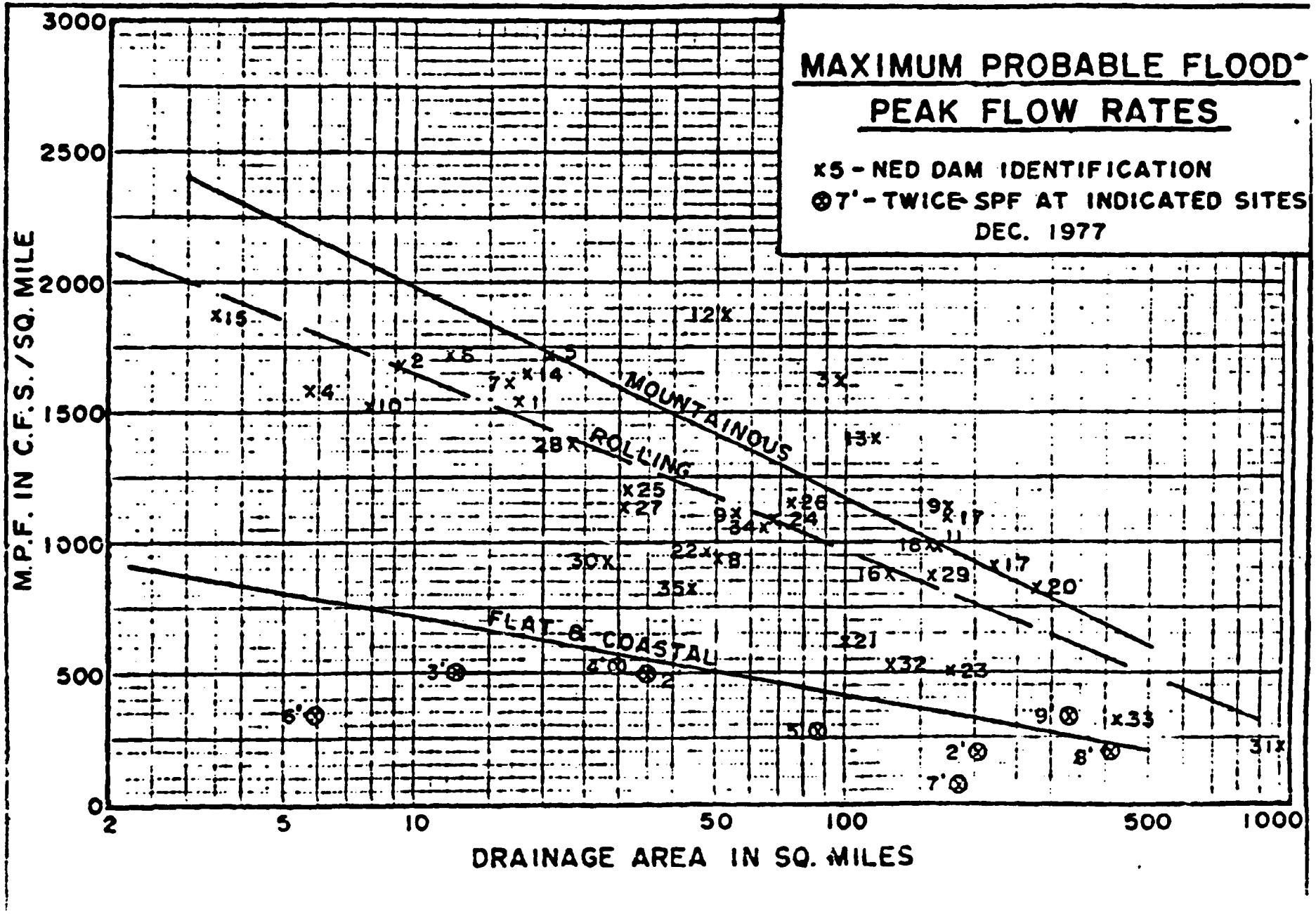
March 1978

MAXIMUM PROBABLE FLOOD INFLOWS
NED RESERVOIRS

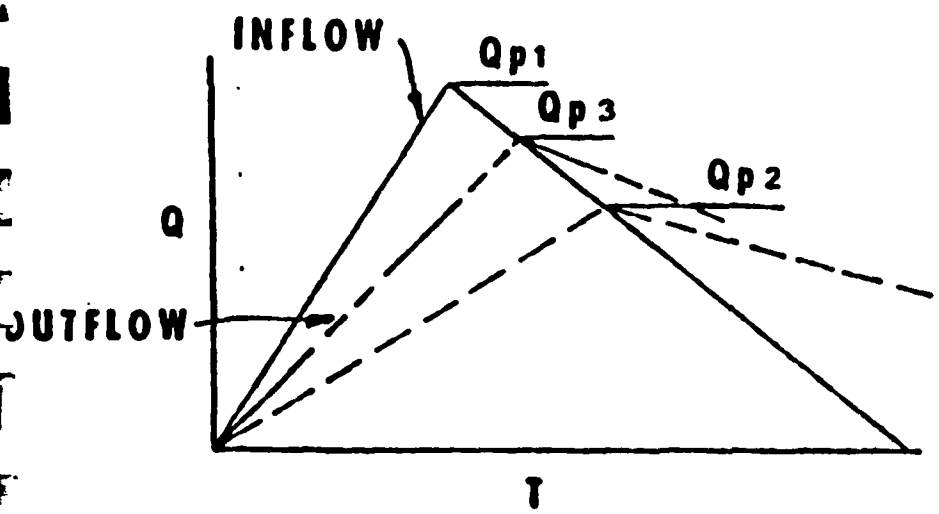
	Project	Q (cfs)	D.A. (sq. mi.)	MPF cfs/sq. mi.
1.	Hall Meadow Brook	26,600	17.2	1,546
2.	East Branch	15,500	9.25	1,675
3.	Thomaston	158,000	97.2	1,625
4.	Northfield Brook	9,000	5.7	1,580
5.	Black Rock	35,000	20.4	1,715
6.	Hancock Brook	20,700	12.0	1,725
7.	Hop Brook	26,400	16.4	1,610
8.	Tully	47,000	50.0	940
9.	Barre Falls	61,000	55.0	1,109
10.	Conant Brook	11,900	7.8	1,525
11.	Knightville	160,000	162.0	987
12.	Littleville	98,000	52.3	1,870
13.	Colebrook River	165,000	118.0	1,400
14.	Mad River	30,000	18.2	1,650
15.	Sucker Brook	6,500	3.43	1,895
16.	Union Village	110,000	126.0	873
17.	North Hartland	199,000	220.0	904
18.	North Springfield	157,000	158.0	994
19.	Ball Mountain	190,000	172.0	1,105
20.	Townshend	228,000	106.0(278 total)	820
21.	Surry Mountain	63,000	100.0	630
22.	Otter Brook	45,000	47.0	957
23.	Birch Hill	88,500	175.0	505
24.	East Brimfield	73,900	67.5	1,095
25.	Westville	38,400	99.5(32 net)	1,200
26.	West Thompson	85,000	173.5(74 net)	1,150
27.	Hodges Village	35,600	31.1	1,145
28.	Buffumville	36,500	26.5	1,377
29.	Mansfield Hollow	125,000	159.0	786
30.	West Hill	26,000	28.0	928
31.	Franklin Falls	210,000	1000.0	210
32.	Blackwater	66,500	128.0	520
33.	Hopkinton	135,000	426.0	316
34.	Everett	68,000	64.0	1,062
35.	MacDowell	36,300	44.0	825

MAXIMUM PROBABLE FLOWS BASED ON TWICE THE STANDARD PROJECT FLOOD (Flat and Coastal Areas)

River	SPF (cfs)	D.A. (sq. mi.)	MPF (cfs/sq. mi.)
1. Pawtuxet River	19,000	200	190
2. Mill River (R.I.)	8,500	34	500
3. Peters River (R.I.)	3,200	13	490
4. Kettle Brook	8,000	30	530
5. Sudbury River.	11,700	86	270
6. Indian Brook (Hopk.)	1,000	5.9	340
7. Charles River.	6,000	184	65
8. Blackstone River.	43,000	416	200
9. Quinebaug River	55,000	331	330


MAXIMUM PROBABLE FLOOD
PEAK FLOW RATES
x5 - NED DAM IDENTIFICATION
⊗7' - TWICE SPF AT INDICATED SITES
DEC. 1977
M.P.F. IN C.F.S./SQ. MILE
DRAINAGE AREA IN SQ. MILES
3000
2500
2000
1500
1000
500
0
2
5
10
50
100
500
1000
MOUNTAINOUS
ROLLING
FLAT & COASTAL
x15
x4
x10
x2
x5
x3
7x
x14
x1
12x
3x
28x
13x
x25
x27
9x
34x
x26
x24
9x
x17
16x
30x
22x
x8
35x
16x
x29
x17
x20
x21
x32
x23
3'⊗
4'⊗
2
6'⊗
5⊗
9'⊗
x33
2'⊗
8'⊗
31x
7'⊗

ESTIMATING EFFECT OF SURCHARGE STORAGE ON MAXIMUM PROBABLE DISCHARGES



STEP 1: Determine Peak Inflow (Q_{p1}) from Guide Curves.

STEP 2: a. Determine Surcharge Height To Pass "Q_{p1}".

b. Determine Volume of Surcharge ($STOR_1$) In Inches of Runoff.

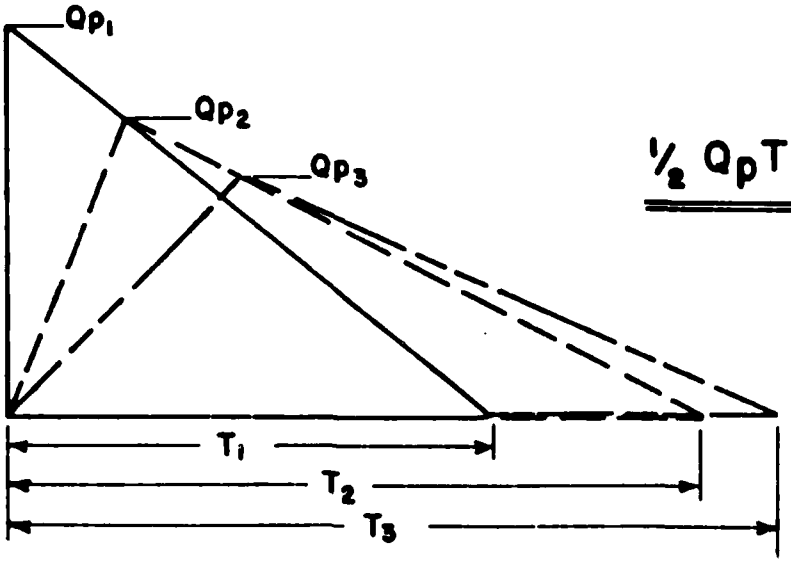
c. Maximum Probable Flood Runoff In New England equals Approx. 19", Therefore

$$Q_{p2} = Q_{p1} \times \left(1 - \frac{STOR_1}{19}\right)$$

STEP 3: a. Determine Surcharge Height and "$STOR_2$" To Pass "Q_{p2}"

b. Average "$STOR_1$" and "$STOR_2$" and Determine Average Surcharge and Resulting Peak Outflow "Q_{p3}".

"RULE OF THUMB" GUIDANCE FOR ESTIMATING DOWNSTREAM DAM FAILURE HYDROGRAPHS



$\frac{1}{2} Q_p T = 12 S$

STEP 1: DETERMINE OR ESTIMATE RESERVOIR STORAGE (S) IN AC-FT AT TIME OF FAILURE.

STEP 2: DETERMINE PEAK FAILURE OUTFLOW (Q_{p1}).

$$Q_{p_1} = \frac{8}{27} W_b \sqrt{g} Y_o^{\frac{3}{2}}$$

W_b = BREACH WIDTH - SUGGEST VALUE NOT GREATER THAN 40% OF DAM LENGTH ACROSS RIVER AT MID HEIGHT.

Y_o = TOTAL HEIGHT FROM RIVER BED TO POOL LEVEL AT FAILURE.

STEP 3: USING USGS TOPO OR OTHER DATA, DEVELOP REPRESENTATIVE STAGE-DISCHARGE RATING FOR SELECTED DOWNSTREAM RIVER REACH.

STEP 4: ESTIMATE REACH OUTFLOW (Q_{p2}) USING FOLLOWING ITERATION.

A. APPLY Q_{p1} TO STAGE RATING, DETERMINE STAGE AND ACCOPMANYING VOLUME (V_1) IN REACH IN AC-FT. (NOTE: IF V_1 EXCEEDS 1/2 OF S, SELECT SHORTER REACH.)

B. DETERMINE TRIAL Q_{p2}.

$$Q_{p_2}(\text{TRIAL}) = Q_{p_1}\left(1 - \frac{V_1}{S}\right)$$

C. COMPUTE V_2 USING Q_{p2} (TRIAL).

D. AVERAGE V_1 AND V_2 AND COMPUTE Q_{p2}.

$$Q_{p_2} = Q_{p_1}\left(1 - \frac{V_{AVG}}{S}\right)$$

STEP 5: FOR SUCCEEDING REACHES REPEAT STEPS 3 AND 4.

APRIL 1978

HYDROLOGIC/HYDRAULIC INSPECTION

PATTACONK RESERVOIR DAM, CHESTER, CT.

I) PERFORMANCE AT TEST FLOOD CONDITIONS:

1) MAXIMUM PROBABLE FLOOD

a) WATERSHED CLASSIFIED AS "ROLLING"

b) WATERSHED AREA: D.A ≅ 1.9 sq mi

NOTE: U.S.G.S. HARTFORD OFFICE DATA: DA = 1.84 sq mi; SKETCH "PATTACONK POND C-14, CHESTER CONN" DATED 3/30/77; D.A = 1.84 sq mi; C.E. FROM USGS HADDAM, CT, QUADRANGLE, 1:24000, DA = 1.90 sq mi; J.J. MUZZOCHI & ASSOC. REPORT DATED 4/5/66 D.A = 2.5 sq mi

c) FROM NED-ACE "PRELIMINARY GUIDANCE FOR ESTIMATING MAX. PROBABLE DISCHARGES" GUIDE CURVE FOR PMF - PEAK FLOW RATES EXTRAPOLATED TO DA's < 2.5 sq mi

PMF ≅ 2200 CFS/sq mi

d) PEAK INFLOW:

PMF ≅ 2200 × 1.9 ≅ 4200 CFS

2) SPILLWAY DESIGN FLOOD (SDF):

a) CLASSIFICATION OF DAM ACCORDING TO NED-ACE RECOMMENDED GUIDELINES:

i) SIZE*: STORAGE (MAX) ≅ 824 AC-FT (50 < S < 1000 AC FT)
HEIGHT ≅ 23' (H < 25')

*STORAGE: FROM U.S. INVENTORY OF DAMS p. 27, DATED 9/15/78; STORAGE AT FLOW LINE: 772 AC.FT; AT MAX POOL: 824 AC FT.; C.E. CHECK BASED ON D.E.P. FISH & WATER LIFE DEPT. LAKE CONTOUR MAP "RUSSELL JENNINGS POND, CHESTER, CONN." SCALE 1"=300' VOL. AT FLOW LINE ≅ 530 AC FT. @ MAX. POOL ≅ 750 AC FT. HEIGHT EST. FROM ELEVS. FROM C.E. FIELD SURVEY, DATED 1/5/79. H = 22.6' 504, 23'

PATTACONK RESERVOIR DAM

2,a - Cont'd) CLASSIFICATION

ii) HAZARD POTENTIAL: THE DAM IS LOCATED (±) 1.5 mi U/S OF CEDAR POND. SEVERAL "A" FRAME HOUSES (±) FROM 2' TO 4' ABOVE THE STREAM BED HAVE BEEN CONSTRUCTED (±) 2200' D/S FROM THE DAM. C.E. FIELD INSPECTION ON JAN. 22, 1979 (HIGH RUN-OFF CONDITIONS) REPORTED THESE HOUSES AND MANY OTHERS, SPECIALLY D/S FROM CEDAR LAKE, WITHIN 2'-3' FROM WATER.

iii) CLASSIFICATION:

SIZE: SMALL

HAZARD: HIGH

b) SDF = $\frac{1}{2}$ PMF ≈ 2100 CFS PMF ≈ 4200 CFS

3) SURCHARGE AT PEAK INFLOW

a) PEAK INFLOW: Q_{P_1} = 2100 CFS Q'_{P_1} = PMF = 4200 CFS (PARAM. CONT.

b) SPILLWAY (OUTFLOW) RATING CURVE:

i) SPILLWAY:

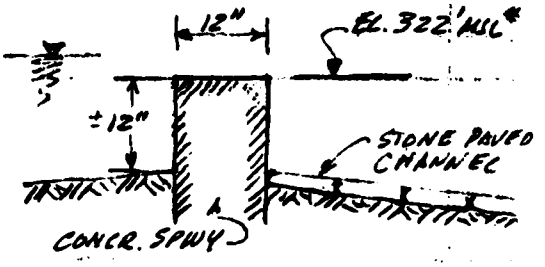
THE SPILLWAY IS CLASSIFIED AS A BROAD CRESTED WEIR OF RECTANGULAR CROSS SECTION. (SEE SKETCH p.3).
THE U/S DEPTH OF THE SPILLWAY IS (±) P=1.0'. THE CREST (UNDER WATER DURING INSPECTION) IS ASSUMED NEITHER ROUNDED NOR SHARP IN PLAN. THE LENGTH OF THE SPILLWAY CREST IS L=28'; THE BREADTH IS 1.0'. THE HEIGHT BETWEEN THE SPILLWAY CR...

PATTACONK RESERVOIR DAM.

3,6-Cont'd) OUTFLOW RATING CURVE

(ELEV. 322' MSL*) AND TOP OF DAM EMBANKMENT (ELEV. 325.6' MSL*) IS H' = 3.6'; HOWEVER, THE SPILLWAY WALLS ARE ONLY H=3.2' HIGH ABOVE THE SPILLWAY CREST. (DATA FROM C.E. FIELD SURVEY DATED 1/5/79)

*NOTE: MSL ELEVS. ARE BASED ON THE ASSUMPTION THAT THE SPILLWAY CREST IS AT W.L. ELEV. 322' SHOWN ON U.S.G.S. HADDAM, CONN. QUADRANGLE SHEET OF 1961, PHOTOREVISED 1971.



∴ SPILLWAY DISCHARGE COEFFICIENT, ASSUME C = 3.3

USING THE CREST ELEVATION AS DATUM (ELEV. 322' MSL), THE SPILLWAY DISCHARGE IS APPROXIMATED BY:

$$Q_s = 92H^{3/2}$$

ii) EXTENSION OF RATING CURVE FOR SURCHARGE HEADS ABOVE TOP OF DAM.

THE DAM IS AN EARTH FILL EMBANKMENT OF (±) 17' TOP WIDTH, ±2.5" TO 1" U/S FACE SLOPE AND ±1.75" TO 1" D/S FACE SLOPE. THE EMBANKMENT LENGTH, EXCLUDING THE SPILLWAY, IS (±) 38'. THE TERRAIN TO THE RIGHT OF THE DAM RISES (±) IN A 2" TO 1' SLOPE FOR A DISTANCE OF (±) 20'. THE LEFT SIDE RISES 2.2' IN A DISTANCE OF (±) 28' AND CONTINUES AT A SLOPE OF (±) 4.5" TO 1'. BOTH SIDES ARE WOODED MOSTLY WITH DECIDUOUS TREES. (C.E. FIELD SURVEY & OBSERVATIONS)

A10

PATTACONK RESERVOIR DAM

3,6-Cont'd) OUTFLOW RATING CURVE

ASSUME $C=3.0$ FOR THE EARTH EMBANKMENT AND
$C=2.5$ FOR THE OVERFLOW AT THE SIDES OF THE DAM

ASSUME, ALSO, EQUIVALENT LENGTHS FOR THE SLOPING TERRAIN AT THE SIDES OF THE DAM, AS FOLLOWS:

$$L'_e = \frac{2}{3}\left(\frac{2}{1}\right)(H-3.6) = 1.3\,(H-3.6)$$

$$L'_L = \frac{2}{3}\left(\frac{2.8}{2.2}\right)(H-3.6) + \frac{2}{3}\left(\frac{4.3}{1}\right)(H-5.8) =$$

$$= 8.5(H-3.6) + 2.9(H-5.8)$$

THE TOTAL OVERFLOW RATING CURVE MAY BE APPROXIMATED BY:

$$Q = 92H^{3/2} + 1160(H-3.6)^{3/2} + 25(H-3.6)^{5/2} + 7.3(H-5.8)^{5/2}$$

THE OUTFLOW RATING CURVE IS PLOTTED ON NEXT PAGE

c) SPILLWAY CAPACITY TO TOP OF DAM:

$H = 3.2'$ $\therefore$ $Q_s = 530$ CFS ($\pm$ 25% OF Q_{P_1} ; $\pm$ 13% OF Q'_{P_1})

NOTE: SPWY CAP. IS TAKEN TO TOP OF SPWY WALLS WHICH ARE ($\pm$) 0.4' LOWER THAN TOP OF EMBANKMENT

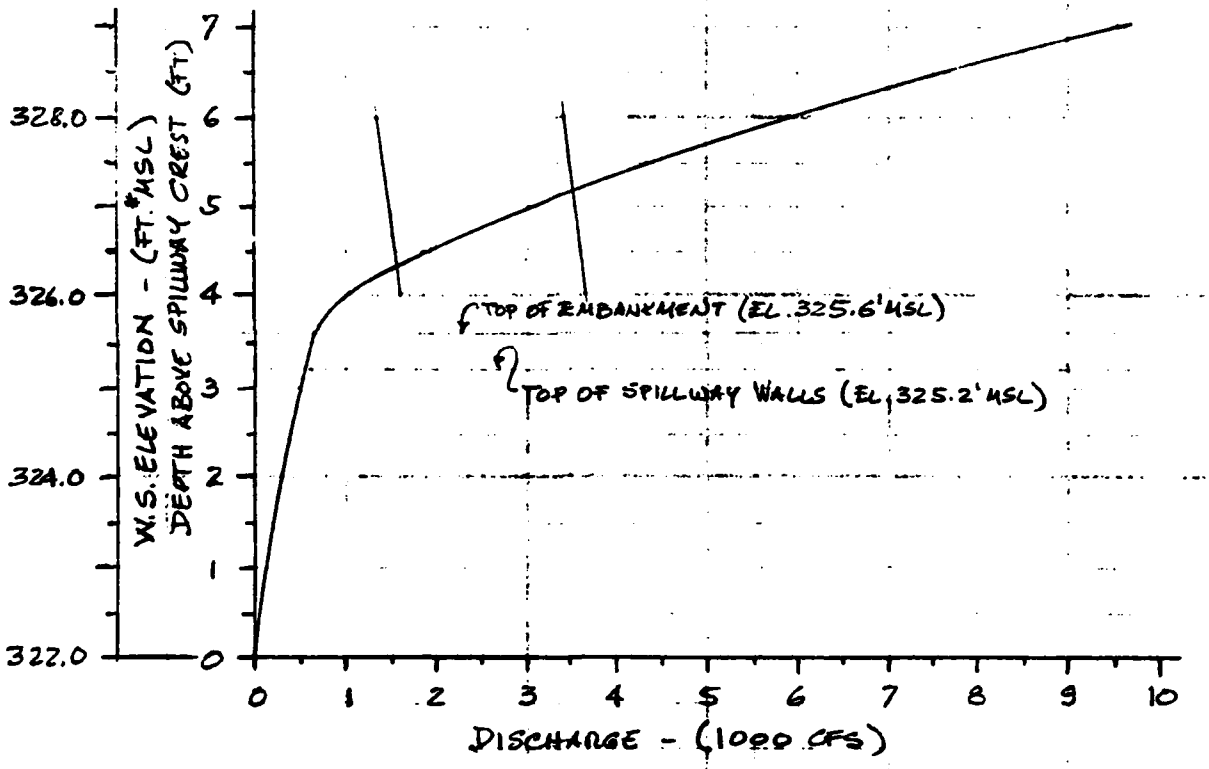
d) SURCHARGE HEIGHT TO PASS (Q_{P_1}):

i) @ $Q_{P_1} = \frac{1}{2}$ PMF $=$ 2100 CFS $\quad H_1 = 4.6'$

ii) @ Q'_{P_1} = PMF $=$ 4200 CFS $\quad H'_1 = 5.5'$

PATTACONK RESERVOIR DAM

3 - Cont'd). OUTFLOW RATING CURVE



4) EFFECT OF SURCHARGE STORAGE ON MAX. PROBABLE DISCHARGES (OUTFLOW)

a) RESERVOIR (LAKE) AREA @ FLOWLINE : $*A_o = \underline{55.5}$ AC

*FROM CONN. DEP. FISH & WILDLIFE LAKE MAP. "RUSSELL JENNINGS POND, CHESTER, CONN." MAP, SCALE 1"=300'. C.E. CHECK MEASURE (USGS 1:24000): $A_N = \underline{55.1}$ AC.; $A = \underline{72.5}$ AC (EL. 330). OTHER SOURCES: U.S. INVENTORY OF DAMS DATED 9/15/78, P. 27: A = 66.5 AC.; DEP. - WATER & RELATED RESOURCES INVENTORY SHEET: A = 51.4 AC.; V.J. MEZZOCHI - ASSOC. REPORT: A = 60 AC

*ASSUMING THAT ELEV. 322' SHOWN ON U.S.G.S. HADDAM, CONN. QUADRANGLE SHEET IS AT SPILLWAY CREST.

PATTACONK RESERVOIR DAM

4,a - Cont'd) EFFECT OF SURCH. STORAGE ON OUTFLOW - RESERVOIR AREA

∴ ASSUME NOR. LAKE AREA WITHIN EXPECTED SURCHARGE: $A = 61^{AC}$

b) ASSUME NORMAL POOL LEVEL (±) 0.2' ABOVE SPILLWAY CREST (EL. 322.2' MSL)

c) WATERSHED AREA: D.A = 1.9 SQ MI (SEE P.1)

d) DISCHARGE (Q_{P_2}) AT VARIOUS SURCHARGE ELEVATIONS:

$H = 6'$ $V = 61 \times 5.8 = 353.8^{ACFT}$ ∴ $S = \frac{353.8}{1.9 \times 53.3} = 3.49"$

$H = 4'$ $V = 231.8^{ACFT}$ $S = 2.29"$

∴ FROM APPROXIMATE STORAGE ROUTING NED-ACE GUIDELINES (19" MAX. PROBABLE R.O. IN NEW ENGLAND)

$Q_{P_2} = Q_{P_1}\left(1 - \frac{S}{9.5}\right)$ AND FOR Q'_{P_1} = PMF $Q'_{P_2} = Q'_{P_1}\left(1 - \frac{S}{19}\right)$

∴ FOR:

$H = 6'$ $Q_{P_2} = 1330^{CFS}$ $Q'_{P_2} = 3430^{CFS}$

$H = 4'$ $Q_{P_2} = 1590^{CFS}$ $Q'_{P_2} = 3690^{CFS}$

e) PEAK OUTFLOW (Q_{P_2})

USING NED-ACE GUIDELINES "SURCHARGE STORAGE ROUTING" ALT. METHOD (SEE P.5)

$Q_{P_2} \approx 1550^{CFS}$ $H_2 \approx 4.3'$ FOR Q_{P_1} = ½ PMF

$Q'_{P_2} \approx 3530^{CFS}$ $H'_2 \approx 5.2'$ FOR Q'_{P_1} = PMF

PATTACONK RESERVOIR DAM

4-Cont'd.) EFFECT OF SURCHARGE STORAGE ON PEAK OUTFLOW

b) SPILLWAY CAPACITY RATIO TO OUTFLOW:

SPILLWAY CAPACITY TO TOP OF SPILLWAY WALLS: $\approx 530^{CFS}$

∴ SPILLWAY CAPACITY IS (±) 34% THE OUTFLOW @ ½ PMF AND (±) 15% THE OUTFLOW @ PMF

5) SUMMARY:

a) PEAK INFLOW: $Q_{I_1} = \frac{1}{2}$ PMF $\approx 2100^{CFS}$ $Q'_{I_1} =$ PMF $\approx 4200^{CFS}$

b) PEAK OUTFLOW: $Q_{O_1} \approx 1550^{CFS}$ $Q'_{O_1} \approx 3530^{CFS}$

c) SPILLWAY MAX CAPACITY: $Q_C \approx 530^{CFS}$ OR (±) 34% OF Q_{O_1} AND (±) 15% OF Q'_{O_1}

THEREFORE, AT SDF = ½ PMF, THE DAM IS OVERTOPPED (±) 1.1' (W.S. EL. 326.3' MSL) OVER THE SPWY WALLS - i.e., (±) 0.7' OVER THE EMBANKMENT) OR, TO AN AVE. SURCHARGE ABOVE THE SPILLWAY CREST OF (±) 4.3'

PATTACONK RESERVOIR DAM

II) DOWNSTREAM FAILURE HAZARD

1) PEAK FLOOD AND STAGE IMMEDIATELY D/S FROM DAM:

a) BREACH WIDTH:

i) MID-HEIGHT (±) ELEV. 314 'MSL $(325.6 - \frac{*23}{2} = 314.1'$ SAY 314 'MSL)
(*SEE NOTE P.1)

∴ ii) APPROX. MID-HEIGHT LENGTH $L_w = 190'$ (C.E. FROM MEAS. ON C.E. INSPECT DWG.

∴ iii) BREACH WIDTH (SEE NED-ACE D/S DAM FAILURE GUIDELINES):

$W = 0.4 \times 190 = 76'$ ∴ ASSUME $W_b = 70'$

b) PEAK FAILURE OUTFLOW (Q_{P_1})

ASSUME SURCHARGE TO TOP OF DAM; THEREFORE,

i) HEIGHT AT TIME OF FAILURE: $Y_o = 23'$

ii) SPILLWAY DISCHARGE: $Q_s = 630$ CFS

iii) BREACH OUTFLOW (Q_b)

$$Q_b = \frac{8}{27} W_b \sqrt{g} Y_o^{3/2} = 12980 \text{ CFS}$$

iv) PEAK FAILURE OUTFLOW (Q_{P_1}): $Q_{P_1} = Q_s + Q_b = 630 + 12980 = 13610$, SAY, 13600 CFS

c) FLOOD WAVE HEIGHT IMMEDIATELY D/S OF DAM:

$Y_2 = 0.44 Y_o = 10'$

PATTAGONK RESERVOIR DAM

2) ESTIMATE OF D/S DAM FAILURE CONDITIONS AT IMPACT AREA

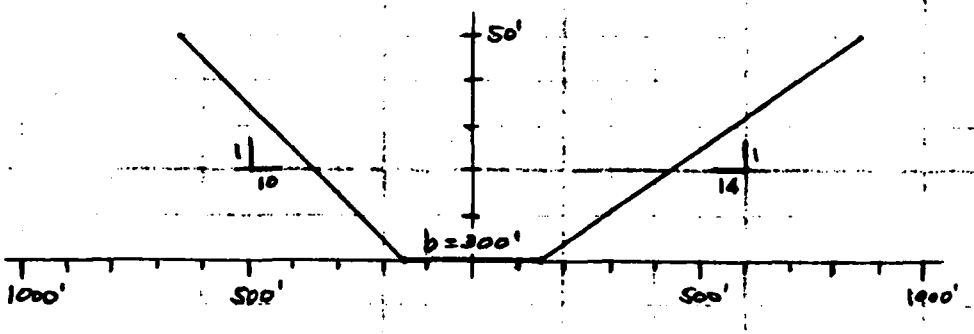
(SEE NED-ACE GUIDELINES FOR ESTIMATING D/S DAM FAILURE HYDROGRAPHS)

ASSUME RESERVOIR FULL TO TOP OF DAM AT TIME OF FAILURE

a) RESERVOIR STORAGE AT TIME OF FAILURE: $S \cong 820$ AC FT (see p.1)
$S/2 \cong 410$ AC FT.

b) TYPICAL D/S CROSS SECTION & RATING CURVES:

(FROM USGS, HADDAM, CT., QUADRANGLE SHEET, PHOTOREV. 1971, SCALE 1:24000)



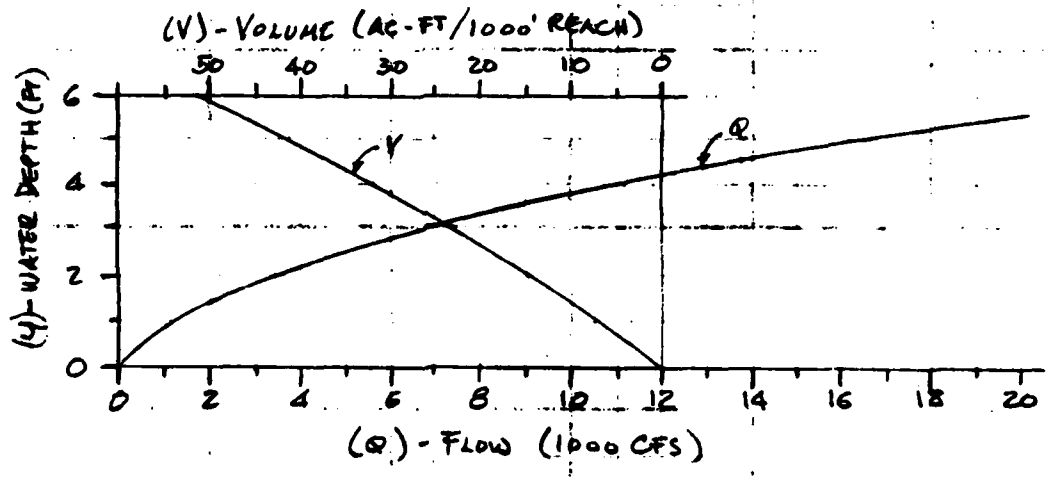
ASSUME: i) $n = 0.050$

ii) SLOPE: $S_o = 1.36\%$
(DROPS 30' IN (±) 2200')

PATTACONK RESERVOIR DAM

2-Cont'd) D/S DAM FAILURE CONDITIONS AT IMPACT AREA

c) RATING CURVES (D/S CROSS SECTION)



d) REACH OUTFLOW (Q_{P_3})

i) ASSUME REACH LENGTH $L = 2200'$ (PATTACONK TO IMPACT AREA - 2 MILES)

ii) @ $Q_{P_1} = 13600^{CFS}$ $\therefore Y_{1_{AV}} = 4.5'$

$\therefore V_{1_{AV}} = 79^{AC\,FT} < \frac{S}{2}$ ok ($\frac{S}{2} = 410^{AC\,FT}$)

iii) $Q_{P_2} = Q_{P_1}\left(1 - \frac{V_1}{S}\right) \approx 12300^{CFS}$ $\therefore Y_{2_{AV}} = 4.2'$ $V_{2_{AV}} = 75^{AC\,FT}$

iv) AVE VOLUME IN REACH: $V_{AVE} = 77^{AC\,FT}$

v) $\therefore Q_{P_3} \approx 12300^{CFS}$ $Y_{3_{AV}} = 4.2'$ (AT IMPACT AREA)

PATTACONK RESERVOIR DAM

II-Cont'd) DOWNSTREAM FAILURE HAZARD

3) SUMMARY

a) PEAK FAILURE OUTFLOW: $Q_{P_1} = 13600^{cfs}$

b) REACH OUTFLOW: $Q_{P_2} = 12300^{cfs}$

c) AVE. WATER DEPTH (STAGE) $Y_2 = 4.2'$

APPENDIX

SECTION E: INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS.

INVENTORY OF DAMS IN THE UNITED STATES

(1) STATE	(2) IDENTIFICATION NUMBER	(3) TYPE DAM	(4) STATE	(5) COUNTY	(6) CONGR DIST	(7) STATE	(8) COUNTY	(9) CONGR DIST	(10) NAME	(11) LATITUDE (NORTH)	(12) LONGITUDE (WEST)	(13) REPORT DATE DAY	MO	YR
CT	[illegible]	ED	[illegible]	[illegible]	02				PATTACONK RESERVOIR DAM	4134.5	7231.5	04	MAR	79

(14) POPULAR NAME	(15) NAME OF IMPOUNDMENT
[illegible]	PATTACONK RESERVOIR

(16) HYDROLOGIC UNIT CODE	(17) BASIN CODE	(18) RIVER OR STREAM	(19) NEAREST DOWNSTREAM CITY–TOWN–VILLAGE	(20) DIST FROM DAM (MI.)	(21) POPULATION
[illegible]	[illegible]	PATTACONK BROOK	CEDAR LAKE	1	200

(22) TYPE OF DAM	(23) YEAR COMPLETED	(24) PURPOSES	(25) STRUCTURAL HEIGHT (FT.)	(26) HYDRAULIC HEIGHT (FT.)	(27) IMPOUNDING CAPACITIES MAXIMUM (ACRE-FT.)	NORMAL (ACRE-FT.)	DIST	OWN	FED R	PRV/FED	SCS A	VER/DATE
[illegible]-CLPG		R		23	824	772	FED	N	N	N	N	04MAR79

(28) REMARKS
PRELIMINARY EVALUATION

(29) O/S HAS	(30) SPILLWAY CREST LENGTH	(31) SPILLWAY TYPE	(32) SPILLWAY WIDTH (FT.)	(33) MAXIMUM DISCHARGE (FT.)	(34) VOLUME OF DAM (CY)	(35) POWER CAPACITY INSTALLED (MW)	(36) POWER CAPACITY PROPOSED (MW)	(37) NAVIGATION LOCKS NO	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)
1	[illegible]	[illegible]	24	560												

(38) OWNER	(39) ENGINEERING BY	(40) CONSTRUCTION BY
CT DEPT ENV PRO		

(41) REGULATORY AGENCY DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
CT WATER RESOURCES	CT WATER RESOURCES	CT WATER RESOURCES	CT WATER RESOURCES

(42) INSPECTION BY	(43) INSPECTION DATE DAY	MO	YR	AUTHORITY FOR INSPECTION
DAM ENGINEERS INC	12	DEC	78	PL 92-367

(44) REMARKS
07,08=UNKNOWN

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF:

NEDED-E

JUL 10 1979

Honorable Ella T. Grasso
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

Dear Governor Grasso:

I am forwarding for your use a copy of the Pattaconk Reservoir Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. The report is based upon a visual inspection, a review of past performance, and a preliminary hydrological analysis. A brief assessment which emphasizes the inadequacy of the project spillway under test flood conditions is included at the beginning of the report.

The preliminary hydrologic analysis has indicated that the spillway capacity for the Pattaconk Reservoir Dam would likely be exceeded by floods greater than 34 percent of one-half the Probable Maximum Flood (1/2 PMF), the test flood for spillway adequacy. Screening criteria for initial review of spillway adequacy specifies that this class of dam, having insufficient spillway capacity to discharge of the 1/2 PMF, should be adjudged as having a seriously inadequate spillway and the dam assessed as unsafe, non-emergency, until more detailed studies prove otherwise or corrective measures are completed.

The classification of "unsafe" applied to a dam because of a seriously inadequate spillway is not meant to indicate the same degree of emergency as would be associated with "unsafe" classification applied for a structural deficiency. It does mean, however, that based on an initial screening and preliminary computations there appears to be a serious deficiency in spillway capacity. This could render the dam unsafe in the event of a severe storm which would likely cause overtopping and possible failure of the dam, significantly increasing the hazard potential for loss of life downstream from the dam.

NEDED-E
Honorable Ella T. Grasso

It is recommended that within twelve months from the date of this report the owner of the dam engage the services of a professional or consulting engineer to determine by more sophisticated methods and procedures the magnitude of the spillway deficiency. Based on this determination, appropriate remedial mitigating measures should be designed and completed within 24 months of this date of notification. In the interim a detailed emergency operation plan and warning system should be promptly developed. During periods of unusually heavy precipitation, round-the-clock surveillance should be provided.

I have approved the report and support the findings and recommendations described in Section 7, with qualifications as noted above. I request that you keep me informed of the actions taken to implement these recommendations since this follow-up is an important part of the non-Federal Dam Inspection Program.

A copy of this report has been forwarded to the Department of Environmental Protection, the owner and the cooperating agency for the State of Connecticut.

Copies of this report will be made available to the public, upon request to this office, under the Freedom of Information Act, thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Protection for the cooperation extended in carrying out this program.

Sincerely yours,

Max B. Scheider

MAX B. SCHEIDER
Colonel, Corps of Engineers
Division Engineer

INVENTORY OF DAMS IN THE UNITED STATES

(1) STATE	(2) IDENTIFICATION NUMBER	(3) REVISION	(4) STATE	(5) COUNTY	(6) CONGR DIST	(7) STATE	(8) COUNTY	(9) CONGR DIST.	(9) NAME	(10) LATITUDE (NORTH)	(11) LONGITUDE (WEST)	(12) REPORT DATE DAY | MO | YR
CT	398	NA	09	007	02				PATTACONK RESERVOIR DAM	4129.5	7231.5	09MAR79

(13) POPULAR NAME	(14) NAME OF IMPOUNDMENT
RUSSELL JENNINGS POND DAM	PATTACONK RESERVOIR

(15) REGION	(16) BASIN	(17) RIVER OR STREAM	(18) NEAREST DOWNSTREAM CITY–TOWN–VILLAGE	(19) DIST FROM DAM (MI.)	(20) POPULATION
01	LR	PATTACONK BROOK	CEDAR LAKE	1	200

(21) TYPE OF DAM	(22) YEAR COMPLETED	(23) PURPOSES	(24) STRUCTURAL HEIGHT (FT.)	(25) HYDRAULIC HEIGHT (FT.)	(26) IMPOUNDING CAPACITIES MAXIMUM (ACRE–FT.)	(27) IMPOUNDING CAPACITIES NORMAL (ACRE–FT.)	DIST	OWN	FED R	PRV/FED	SCS A	VER/DATE
RE-CLTPG		R		23	824	772	FED	N	N	N	N	09MAR79

(28) REMARKS
21=SETBACK 22=UNKNOWN

(29) D/S HAS	(30) SPILLWAY CREST LENGTH	(31) SPILLWAY TYPE	(32) SPILLWAY WIDTH (FT.)	(33) MAXIMUM DISCHARGE (FT.)	(34) VOLUME OF DAM (CY)	(35) POWER CAPACITY INSTALLED (MW)	(36) POWER CAPACITY PROPOSED (MW)	(37) NAVIGATION LOCKS NO.	(38) LENGTH (FT.)	(39) WIDTH (FT.)	(40) LENGTH (FT.)	(41) WIDTH (FT.)	(42) LENGTH (FT.)	(43) WIDTH (FT.)	(44) LENGTH (FT.)	(45) WIDTH (FT.)
1	210	1	28	560												

(46) OWNER	(47) ENGINEERING BY	(48) CONSTRUCTION BY
CT DEPT ENV PRO		

(49) REGULATORY AGENCY DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
CT WATER RESOURCES	CT WATER RESOURCES	CT WATER RESOURCES	CT WATER RESOURCES

(50) INSPECTION BY	(51) INSPECTION DATE DAY | MO | YR	(52) AUTHORITY FOR INSPECTION
DAM ENGINEERS INC	12DEC78	PL 92-367

(53) REMARKS
47,48=UNKNOWN

This Phase I Inspection Report on Pattaconk Reservoir Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

JOSEPH W. FINEGAN, JR., MEMBER
Water Control Branch
Engineering Division

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

JOSEPH A. MCELROY, CHAIRMAN
Chief, NED Materials Testing Lab.
Foundations & Materials Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR
Chief, Engineering Division